The Journal of Traumatic Surgery and Occupational Diseases

Industrial Medicine

for

Physicians and Surgeons in Industry

Volume

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Ella M. Salmonsen, medical reference librarian at The John Crerar Library, Chicago. Physicians and students of medicine have been familiar with her efficiency at the library for many years.

THE CONTENTS. The book contains two sections. Section I contains Bibliographical References from the years 1556-1933, followed by a Subject Index, Index of Reference Group Headings, Authors Index and Reference-Index. Section II contains Laws of the States, followed by cases.

There are over 2700 references listed in the book, listed alphabetically and by years.

Note these reference titles included among many for the year 1933:

Cancer: Relation between pulmonary cancer and pneumoconiosis.

Cement: Effect of cement dust upon workers.

Hygiene: Physiologic examinations in industrial occupations which inhibit respiration.

Silicic Acid: Silicic acid content of lungs in pneumoconiosis.

These are but a few of over 200 references for the year 1933 alone.

FUTURE REFERENCES. It is reasonable to expect that frequent revisions will be made to comply with demands for information regarding the latest publications on occupational diseases from inhaled dust, new statutes enacted for their prevention, and modification of laws prescribing indemnity. It is planned to issue Volume II of this reference book at an early date.

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—and **when**

—and **where**

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"My Debt not a penny takes from me,
As sages the matter explain;—
Bob owes it to Tom, and then Tommy
Just owes it to Bob back again.
Since all have thus taken to owing
There's nobody left that can pay;
And this is the way to keep going,—
All quite in the family way.

Industrial Medicine

My senators vote away millions,
To put in Prosperity's budget;
And though it were billions or trillions,
The generous rogues wouldn't grudge it.
'Tis all but a family hop,
'Twas Pitt began dancing the hay;
Hands round! — why the deuce should we stop?
'Tis all in the family way."
—THOMAS MOORE.

The Journal of Traumatic Surgery and Occupational Diseases

The Law, the Science and the Economics of Industrial Health

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Industrial Medical Service

—*Its Value When Carefully Planned and Efficiently Administered*

by

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MEDICAL service in an industrial establishment can provide a very valuable contact between management and employees, and conversely it can be a great source of difficulty if it is not carefully planned and efficiently given. It has been only a few years, 25 or less, since this sort of service was established. In the beginning it was a simple first aid service for industrial accidents. Even this first aid service was rendered only occasionally by regular doctors. More often it was given by some boy who liked the smell of disinfectants and was allowed to do the dressings of those injured. If the injury was serious enough some neighborhood doctor might be called in, or the case might be taken to a hospital.

All of these beginnings were very simple and rudimentary, and, on the whole, unsatisfactory. Like other developments in present-day standards, it is now considered that no medical service is too good for an industrial establishment; in fact, thorough, efficient service rendered by men with the best training is the only kind that pays. Inefficient service makes trouble, first, because of the dissatisfaction of the employees, and second, because it is very expensive for the management of industry. There is but one satisfactory rule regarding the service for accidental injuries, namely, efficient and sufficient service, promptly given and continued as long as is necessary.

When we remember that industry in the general sense is an actual part of the community in which it exists, we can easily see that there is a very definite and important public and community relation between the individual industrial establishments and those organized activities of the community which have to do with community service. It then follows very naturally that all industrial relation functions and problems, including the functions and problems of industrial medical service, have a direct relation to the community. The health of the community reflects itself in the industrial establishment; the health of the employee in the industrial establishment has its direct effect on the welfare of the community. If, for example, typhoid fever is common in the community, it is to be expected that members of an industrial organization who live in the community will suffer from the common menace. On the other hand, if an industry has occupational and industrial hazards of various kinds producing disabling injuries and occupational disease, this condition has its direct relation to the whole community.

So much for the general consideration of the relation of problems of this subject.

Any industrial medical service is built around the qualifications of the staff giving this service. As stated before, good service is the only kind that pays; it is the only sort that cements friendly relations between employer and employee and prevents dissatisfaction and argument. The day has come when only well-trained doctors with special qualifications are acceptable for this kind of work. They must not only have good medical education according to modern standards, but also by temperament and ambition they must fit into the industrial relations program of industry.

There has been considerable argument about employing doctors full time or part time in industrial work. There are arguments for both plans. I have maintained, and still believe, that the best service can come only from the doctors who not only understand the industrial aspect of the job but also retain their contacts with the community at large through hospitals, schools, dispensaries, medical associations, etc. The industrial doctor who separates himself from his community responsibilities is apt to be misunderstood, and in my opinion will sooner or later suffer in efficiency from this lack of community contact.

It is reasonable, I think, to believe that a competent doctor needs proper equipment and a decent place to work in. The technique of the job, the requirements for cleanliness and sterilization, are important if the job is to be done right. A make-shift office with poor or mediocre equipment is a bad investment and a bad influence in

* Read before the Industrial Relations Association of Chicago, Feb. 11, 1935.

an industrial relations organization. Industrial dispensaries do not have to be hospitals, but they should have enough equipment to make ordinary tests and to determine whether there are broken bones or diseased lungs.

All industrial medical service plans include hospital facilities. Again, just as there has been difference of opinion regarding part and full time doctors, there have been varying ideas about company and community hospitals. This talk will not permit me to go into the arguments in detail, but I am satisfied from years of experience that because of the intimate relation between an industrial establishment and the community in which it exists the best service can be obtained by using community hospitals. I am sure that even our large industrial establishments have not had very satisfactory reactions from service in their company hospitals.

I mentioned surgical service. I do not propose to discuss this phase of the work any further because in my opinion the surgical service for industrial accidents has been standardized, and there should be no argument about its program.

Medical as distinct from surgical service, however, has no definite plan. There has been a great deal of talk and many arguments, and many different plans have been tried.

In this country we find plans varying all the way from no service at all to complete company medical service for employees and their families.

In my opinion a plan which includes responsibility for all the medical ills of the employee and his family is apt to be a very discordant influence in an industrial relations set-up. It is too comprehensive and too complicated to permit any happy solution.

There are certain things, however, which are definitely industrial and which can and should be done by the medical department of an industrial establishment. I do not think there is very much argument at the present time about employment examinations. Generally speaking, the idea of periodic re-examination of employees is an accepted principle. Supplementing these two, it is very easily seen that there is reason for special examinations, particularly where the occupation has some hazardous aspect. There is also evidently good reason for a special examination when a change of occupation, a transfer to some different location, or a retirement, is contemplated.

You will notice that I have not included treatment. It is my belief that the physical examinations, supplemented by general help or direction in getting satisfactory treatment, should be the usual limits of this program of medical as distinct from surgical service. Of course we all know that in any set-up in an industrial establishment there are always reasons for some exceptions. When an employer knows that a faithful employee needs something special in order to correct an ailment or prolong life, and this special thing cannot be obtained by the man himself, it is the unusual executive who does not at least have the urge to help in some way. To assume, the responsibility of the treatment of all kinds and conditions of illness is, however, as stated above, a bit too complicated at the present time for industry to undertake.

It is particularly desirable at this time, because of the recent arguments which have arisen regarding occupational hazards and disease, compensation laws and civil damage suits, to discuss this subject briefly. There is a very unsatisfactory situation at present in the laws or lack of laws which have to do with compensation for occupational disease. Because of this unhappy situation there have come to light literally thousands of claims, most of them unjustified, because of injuries which theoretically might have been caused by some industrial exposure. This unsatisfactory condition has resulted in a great deal of hard feeling between industrial management and employees. The sooner this legal tangle is straightened out, so that the individual who actually has an occupational disease may get satisfactory compensation without a great deal of legal delay, the better for everybody concerned. The so-called industrial disease racket has only been made possible because of inadequate laws and the aggressive action of unscrupulous legal opportunists.

I do not think there is any question that manufacturing methods in modern industrial establishments have developed various hazards which have not been appreciated by those occupied in industry and the management of industry. There is no doubt that there must be a great deal more effort in the future to understand and evaluate potential disease hazards if the future is to be saved from arguments regarding these hazards. Like any other problem, the first fundamental is an accurate knowledge of these hazardous conditions, which can be obtained only by careful engineering and medical study. If a plan for this sort of study is backed up by an aggressive policy and is given its relative importance in a manufacturing program, there is no doubt in my mind that these hazards will be promptly and adequately taken care of. While a careful survey of all such hazards should be included in any modern industrial policy, the medical departments of industrial establishments should be developing in the meantime all of the routine methods necessary to a determination of occupational disease in its various stages.

If industrial doctors learn to recognize the beginings of such trouble, the cooperation of the medical department and the engineering divisions should make it possible within a very short period of years to eliminate all the so-called dust diseases which are now receiving so much attention.

It is difficult properly to round out a discussion of this kind because there are so many phases that need amplification and discussion. As I have said, the modern industrial medical department can and should be one of the strongest influences in cementing a cordial relation between industrial employees and management. This can be done only by a staff of the highest caliber, an adequate place in which the staff can work and modern facilities for making accurate observations. This organization and equipment should be constantly used to assist in determining any industrial factor which affects the health of industrial employees.

A medical department in an industrial unit can be of greatest service both to management and employees when a comprehensive plan for such service has been worked out as a part of the whole industrial relations program.

Acute Mercurial Poisoning

WHILE the subject of acute mercurial poisoning is not one of great moment to industrial physicians, recent animal experiments by Rosenthal* may provide research principles, ultimately leading to the solution of some of our present problems in the control of industrial mercurial poisoning.

The chief point of interest to the industrial physician is that through the use of certain compounds, the toxicity of mercuric chloride has been favorably influenced. For example, sodium thiosulphate protected the rat testes against the action of mercury if added before the mercury, but not at all if the mercury was added first. With the liver, protection was observed when the thiosulphate was added either before or just after the mercury. With the kidney, no protection could be observed in any case, whether the thiosulphate was added before or after. Injected along with bichloride subcutaneously into rabbits' ears, thiosulphate prevented the local inflammatory reaction of bichloride. Injected intravenously into rats, thiosulphate did not protect against a subsequent lethal injection of mercury.

Glutathione was able to counteract the toxic action of bichloride on the oxygen consumption of rat tissues, including kidney, when added either before or up to one-half hour after the addition of mercury. Glutathione prevented the local infllammatory reaction of bichloride when injected subcutaneously along with it. Glutathione saved 10 of 12 rats when injected intravenously previous to a lethal dose of bichloride. Eleven of 12 rats were also saved when the glutathione was injected one-half hour after the bichloride. Glutathione did not protect two dogs when injected previous to a lethal intravenous dose of bichloride. Similar results were obtained upon two dogs with cysteine.

Formaldehyde sulphoxylate counteracted the effect of mercuric chloride on the oxygen consumption of rat tissues if added before the bichloride, but not if added subsequently. Likewise, on rats injected intravenously with fatal doses of bichloride, five of seven were saved if sulphoxylate was injected previously, but none of 10 if injected 25 minutes following the mercury.

Upon dogs the following results with sulphoxylate were obtained: five dogs received an intravenous injection of sulphoxylate prior to the injection of a fatal dose of bichloride; all survived. Of eight control animals, seven died. Of four dogs receiving 20 mg. of bichloride per kg. by mouth, and two intravenous injections of sulphoxylate subsequently (after 17 and 35 minutes, and againt after 4½ hours), all survived. Of four control animals, one survived. Six dogs received 25 to 35 mg. of bichloride per kg. by mouth and intravenous injections of sulphoxylate subsequently. Two of these animals survived, while none of six controls survived. Twelve dogs received 25 mg. of bichloride per kg., by mouth and both oral and intravenous doses of sulphoxylate 40 to 90 minutes later; nine of the 12 survived. Of a total of 10 controls dogs receiving this dose of bichloride and intravenous and oral salt solution as therapy, nine died. Nonprotein nitrogen determinations made subsequent to the intoxication on the treated dogs showed no elevation in nine of 10 animals, while marked rises occurred in the control animals.

One human case of bichloride poisoning received intravenously 0.5 gm. of sulphoxylate per kilogram of body weight and approximately 15 grams by stomach tube with no ill effects. Recovery without renal damage occurred in this case.

Through further experimentation on animals, it may be possible to discover other compounds which will also favorably influence the toxic effects following inhalation of mercuric salts commonly used in industrial processes.

* Rosenthal, Sanford M. Experimental Studies on Acute Mercurial Poisoning. *U. S. Public Health Reports* 48:1543-1560, December 29, 1933.

Evaluation of Chest Pathology

By CARROLL EUGENE COOK, M.D.*

THE present day problem that faces us during the many-sided economic period, is no more clearly shown than in the varied and interesting study of the chest. That the radiological aspect is one of most vital importance is conceded by all who are at the vital summary of most of the terminal conditions. The many varied shadows met in the chest that so nearly simulate each other, make all avenues of diagnostic aid welcomed by all well-meaning and open-minded medical consultants. One sees a great many confusing shadows in many of our respiratory conditions that may be so familiar by long and careful observation that something of less importance that may be a contributor is apt to be overlooked.

An opinion based upon roentgen evidence alone is of about the same value as an opinion based upon clinical findings alone. Without a careful history, both lose much of their worth. Combined with other evidence, however, it may be of great value—without a doubt it is capable of revealing changes in the lungs which cannot be demonstrated by any other method.

In difficult cases, or those in which physical signs are absent, the roentgenogram may be the confirmatory evidence upon which a diagnosis is made—and in certain well-defined cases, it may give a more accurate picture of the extent and distribution of the process, and in this way give aid both to the prognosis and the treatment of the case.

Unfortunately, very few roentgenologists are well-trained clinicians. It is perhaps equally unfortunate that few clinicians have sufficient knowledge in interpretation of roentgen findings.

The cooperation of both clinician and roentgenologist, or the combined use of a single investigator, will obtain better results. The most careful and painstaking history often fails to reveal some of the most profound and complicated films that are met. A scoliosis may displace the heart or great vessel and give a peculiar shadow that can easily be misinterpreted.

All examinations should be supplemented by a careful fluoroscopic examination. The thoracic cage—the anatomical relation of the usual landmarks—the clavicles and their relation—the possibility of old fractures—the calcification of the costal cartilages—the contour and movement of the diaphragm—the illumination of the apices, both under deep inspiration and on coughing—position and shape of the heart, its regularity and rhythm—all are factors that can be discerned on-

* Read at the Silicosis Symposium, Central States Society of Industrial Medicine and Surgery, 1934 Annual Meeting.

ly by means of a careful fluoroscopic observation.

In the oblique view, you can observe the position and size of the heart, the great vessels, the mediastinal space—and the possibility of glandular structures not to be seen in the film. The varying types of hilum pathology are always valuable in forming an opinion in the correlation of facts. The ideal procedure, it seems to me, should be a fluoroscopic observation, at which time definite records are made as to the excursion of the diaphragm, changes and shape of any abnormal shadow in reference to respiration, and coughing. If evidence of importance is to be recorded, it should be done on stereoscopic plates and a single lateral in the optimo position to best bring out the outstanding landmarks. These can easily be kept in proper relation by a little device called the angle of incidence.

In the study of films or in the fluoroscopic observation, every anatomical structure should be surveyed. The contour and shape of the chest, the position of the patient so that all the pulmonary field possible can be taken with the least confusion by the bony anatomy—this is particularly true of the scapula.

Carefully survey the soft structures for cervical or axillary adenopathy. Variation in the contour of the soft structures often gives a clue to some of the existing conditions. Sharp or doming of the diaphragm may be due to adhesions or to some subphrenic pathology having no connection with the chest. The lung markings are very important, varying of course in the different avenues of endeavor—the trachea and main bronchi—their location and position, and the inter-lobar septum which may cause some confusion.

The trunk shadows and lesser markings can vary greatly by many conditions that may cause lymphatic block, excessive secretion or lack of aeration. These must all be differentiated from those caused by cardiac decompensation with passive congestion or some of the coronary conditions causing stasis. Upper respiratory tract infections, especially those involving the posterior ethmoids, can give a beautiful film which can easily be mistaken for some industrial process.

The knowledge of the structure and drainage of the lymphatic system is essential for a better understanding of the reason for the distribution of fibrosis in either the infective or industrial phagocyted particles. The direction of lymph drainage is toward the hilum, except the lymphatics coming from the pleura, covering the lower half of the lower lobe and the adjacent portion of the lung, which pass through ligamentum pulmovale to reach the pre-aortic nodes and not the hilum. The smaller lymphoid structure becomes larger as it converges toward the hilum, and the retention stations are larger until they reach the central division of the bronchial tree, where they become true lymph nodes. It is these lymphoid deposits that are so very important in tubercular as well as all industrial conditions, because of the fact that they are the points of stasis for all phagocyted particles and these lead to the ultimate fibrosis, which is the small concrete or definitely outlined areas in the film.

The fibrosed peribronchial shadows naturally become larger and more concrete as part of the hilum drift concentrates at the larger nodes. It is the damming back of this drift which leaves no course open for the laden phagocytes but the interstitial interalveolar tissue with consequent fibrosis.

It is therefore essential, before making an ultimate diagnosis, that the history be carefully studied relative to exposure, length of time, and type of exposure. Many times I have been called to see patients with definite pneumofibrosis who had never been exposed to any type of industrial hazard.

In view of the present situation, many possibilities have been opened for the questionable unemployed to remember that at some time he was employed in a semi-hazardous occupation. The finding of some of the many types of lymph block fibrosis—this aided by the ever-willing legal vulture—has brought many non-industrial contracted conditions into the courts of compensation. It is in these conditions that I want to lay particular stress in the early diagnosis and careful correlation of facts.

One must be familiar with a large number of the frequently encountered chest conditions before much significance can be relied upon to determine the most likely type of pathology. The most frequent radiological finding is tuberculosis in varied forms and many peculiar and unusual types. The fan-shaped areas described by Dunham are the most frequent, but also the most readily recognized. The childhood type that has left its landmarks is always to be carefully evaluated in the correlation. Passive congestion, the result of cardiac decompensation, makes a very beautiful pneumofibrosis which sometimes clears up very quickly when the heart returns to normal. Passive congestion following coronary thrombosis is due to pulmonary stasis and usually can be identified in the right lung. Advanced bilateral bronchiectasis, seen quite frequently in this section and during the cooler seasons, is one of the most difficult conditions to rule out. Careful differentiation by the opaque oil method is advisable.

Asthma produces various alterations in the normal markings that are intensified during attacks. Emphysema with its destructive parenchymal areas may be easily confused.

Metastatic malignancy is one of the very confusing conditions that is not infrequently met, and is always to be kept in mind in dealing with the chronic diseases with predominant chest findings. Syphilis of the lung is practically unknown, and many cases that have been carefully followed to autopsy usually end in some of the malignant categories. It is true that the cardiac complications that accompany specific infections, such as valvular lesions and aortitis, frequently clear up under specific treatment. The clearing of the hilum fibrosis and passive congestion of the lung is due in the main to the improvement of the cardiac and underlying causes.

Nodular metastatic malignancy of the lungs is usually differentiated from the industrial chest by the distribution of the nodules.

Primary bronchigenic carcinoma is now recognized much more frequently because of the more efficient diagnostic methods.

Pneumoconiosis.

PNEUMOCONIOSIS, the term which is so frequently heard in our present day of depression psychosis, may be one of many diversified

forms of inspiration processes induced by the inhalation of various kinds of dusts that are further subdivided into the origin of silicosis due to the inhalation of silicon dioxide SiO_2, one of the component parts of stone dust. Anthrcosis, in those who are employed in the coal and cement industry, has an entirely different phase. Pneumoconiosis is a condition due to inhalations of minute particles and characterized by the resultant fibrosis.

The dust which produces this fibrosis must necessarily gain entrance to the lymphatic system of the lungs. This means that these minute particles must reach the portion of the air passages beyond the ciliated cells and where the alveoli are in open relation, for this is the only point of entry to the lymphatic system. These particles of dust must be small enough to be phagocyted. It is presumed that few particles above 10 microns can be so carried.

These dust cells may lodge in the relay stations of the lymphoid system; others may go further. They apparently undergo a chemical change in composition into a colloid hydrate which is a destructive agent to cells. This may be due to the alkaline reaction of cells and body fluids. These dust-laden cells die and discharge their contents, which are destructive to the surrounding lymphoid deposits, causing cellular reaction with both infiltration and proliferation which eventuates in necrosis. These later may become the primary foci for the entrance of the tubercle bacilli that plays such an important role in most industrial cases. If perchance there may have been a juvenile tuberculosis as a background, this superimposed lymph-laden irritant may be the means of reactivating a long quiescent process. The clinical course of many of the industrial cases is undoubtedly the best criterion to follow. Many patients with rather marked infiltration show little or no incapacitation.

Pure anthracosis causes a progressive passive congestion due to plugging of the lymphatics. The perivascular and peribronchial lymphatics sometimes become plugged with phagocytes laden with coal particles so that there is a stasis in the lymph flow. The only fibrosis is a result of this passive congestion. There is not the tendency to develop tuberculosis that exists in silicosis. In fact, these people seem less prone to develop tuberculosis than ordinary people. There is more of a tendency to develop local acute infections resulting in bronchiectasis and abscess formation, with a tendency to have a terminal influenza and pneumonia.

A number of our foreign countries have had considerably more experience and thoughtfulness, and have organized industrial committees with regulations governing such hazards. These committees, which consist of two medical men and a radiologist, are appointed by the minister of labor. The medical men are all members of the national societies and are chosen because of their experience in conditions involving such hazards. The provisions of the so-called scheme relate to the examination of workmen who have been employed for a prescribed period in industries such as working in sandstone, stone-masons, quarrymen, rock-choppers, etc. Since the operation of this plan, 2324 workmen have been examined, divided as follows:

Stone masons	344
Quarrymen	380
Rock cutters	1,600
	2,324

2,038 were sent by employers for medical examinations; 286 attended for examination while temporarily out of work.

The examinations classify the workmen into four main groups:

1. Those found to be unsuitable for work in the industry, failing to satisfy the requirements of the schedule in respect of physique (suspended upon initial examination).

2. Those suffering from a disease under the scheme to such a degree as to make it dangerous to continue work in the industry: these are suspended.

3. Those not suffering to such a dangerous degree, and not suspended.

4. Those not suffering from a disease under the scheme.

128 have been found to be suffering from a disease under the scheme to such a degree as to render them eligible for compensation.

In 122 of these cases compensation has been awarded. In 6 cases the workmen were unable to satisfy the joint committee that they had been employed in the industry for the prescribed period before the date of their incapacity.

89 had been certified at the end of the year to be suffering from a disease covered by the scheme, but not to such a degree as to make it dangerous for them to continue working in the industry to which the scheme applies.

123 workmen have been suspended by the medical authority, as the result of an initial examination, from further employment in the industry; 35 of these have been found to be suffering from a disease to which the scheme applies, and 88 have been found to be not suffering from such a disease, but have failed to satisfy the requirements of an initial examination.

1,750 have been found to be not suffering from a disease covered by the scheme, and to satisfy the requirements of an initial examination.

218 workmen, exempted from an initial examination, have been found to be not suffering from a disease covered by the scheme, but not to satisfy the requirements of such an examination.

16 certificates were outstanding at the close of the year under review.

Have An Aspirin

ATHLETIC directors, barbers, beauticians, show salesmen, druggists, swell the growing number of those selling medical advice. Banks, industrial corporations, universities, and public utilities are organizing 'welfare departments' under various names and guises, where employees, students, even the public, are receiving 'medical care.' How harmless seems the sale of aspirin, headache powders, laxatives, mercurochrome and camphor in a 'rest room;' when someone is found unconscious the physician is not thought of and called, but the police department with an oxygen tank. Will physicians ever be able to take a leaf from the lawyers' code and distinguish between charity and imposition?"—Committee on Medical Economics, Jefferson County (Ky.) Medical Association.

The Pneumonokoniosis Problem

—From the Standpoint of Pathology—

by

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NO GROUP of medical men have been more severely tried than the physicians who have come in contact with that branch of industrial medicine known as pneumonokoniosis. First a medical curiosity, then a common reality and now a species of racket are some of the evolutionary phases through which this field of medicine has passed in the last century.

There was a time when the men who worked in dusty occupations had no protection at all. In certain types of work, they began work, lived 10 to 15 years and died of this or that form of consumption. If they were grinders, it was "grinder's consumption," if stone cutters, it was "stone cutter's consumption." This was in the age of ignorance. Later when these conditions became better known, legal machinery was instituted to protect such workmen, by awarding heavy damages to the injured. Now this legal machinery is being applied ruthlessly and many times with great injustice to the employers. There is no brief whatever for the business house who has injured a man without making restitution, but something must be done to protect them from paying damages for which they were in no way responsible, as is now happening quite often.

The reason for this state of affairs is that certain facts are not clear. For example, it is not sufficiently well known when disease begins, when a complication begins or when disability begins and ends. These are facts that must be determined by the medical profession. Some of the pressing needs at present are, a better classification of the subject and a clearer definition of terms; a more accurate determination of different stages of each type of disease with its corresponding presumptive disability; the relation of each type and each stage to associated diseases like pneumonia, influenza and tuberculosis, and a better knowledge of the pathology on which much of the new knowledge must depend. When these various facts are well established, the gross forms of injustice will disappear.

There is little question but the aim of honest lawyers and physicians is to guard against injustice. The trouble is that our knowledge is inadequate or too confusing to convince a jury beyond reasonable doubt. On the one hand, a jury has to consider a man's life, health and happiness; on the other, the industrial concern representing varying amounts of wealth. As a result, they usually make the "money" pay if there is any doubt at all. The injustice of a malingerer, or a misguided invalid, virtually driving legitimate business into bankruptcy, is a secondary consideration when a man is before them who is dying of an incurable disease, even if the cause of the disease is obscure. It is up to the medical profession, therefore, to clear up the doubts and permit of an accurate determination of liability.

It is true that industrial commissions are doing a great deal to clear up some of these questions. This is particularly true of the South African Commission[1], as well as others, but there still is much to do.

What is the best way to proceed in this course? The clinical, epidemiological and roentgenological aspects of this disease have been partially established. But they do not seem to have been properly correlated. Neither has presumptive disability, for each type and phase of the disease been adequately determined. The keystone of the arch of this medical problem, we believe, is pathology supported by chemistry. Now is the time to build on the foundation of pathology and pathogenicity, just as general medicine was built on pathology during the last century.

Inasmuch as silicosis and silico-tuberculosis form the greater part of this problem, it is proper that the most time be devoted to them. Nevertheless, other dust diseases often complicate the silicosis, so they must be mentioned, especially for comparison. This whole field may be grouped into two divisions, comprising organic and inorganic dusts. They will be discussed in the order given.

Organic dusts occurring in the textile industries, flour milling and other similar work, occasionally become a problem. Such dust, however, is offensive chiefly because in some people it produces bronchial irritation followed by cough, which may form the basis for more serious diseases like tuberculosis and the fungus infections.

There are other organic dusts, however, that seem to possess toxic properties or may produce a sensitization in the allergic sense. In the latter type may be included the castor bean dust reported on first by Fidgley[2]. Here there seemed to be a sensitization to the castor bean protein. The spores of the fungus *coniosporium corticale*, reported by Towey, Sweany and Huron[3], is another, but of a slightly different class. Although not an infection at all and apparently not an allergic phenomenon, it did produce a serious disease. In this instance, there was an irritating substance that seemed to sensitize the bronchi locally. This irritation became accumulative and later resulted in a profound pneumonitis. On a study of the route of these spores in monkeys, they were found to be taken up into the lymphatic towards the hilum of the lung and become gradually destroyed, leaving no permanent fibrosis as in silicosis, nor a permanent blocking as in anthracosis. The principal point in comparison is to show the relative disability produced. There was a complete disability in about 35% of men working in contact with the dust, but the disease was cured simply by removing the person from contact with the spores. In allocating damage for such disability, the time lost is the only real loss. Allocation of damages is therefore a simple matter.

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* Read at the Silicosis Symposium, Central States Society of Industrial Medicine and Surgery, 1934 Annual Meeting.

In the inorganic dusts, however, the damage is usually more persistant. Silicosis is the spectre that causes industrialists to have bad dreams. The reason is that silicosis is one of the most specific and one of the most disabling of all diseases. It results when people are in long contact with dust, containing finely divided silicon dioxide. Furthermore, according to Gardner's[4] animal experiments, it seems to be related to tuberculosis by affording a soil for the development of the tubercle bacillus. There is good evidence also that this is true as well in human disease. We can see, therefore, that there is not one disease, but two or more in one. In fact the various types described for silicosis depend more upon the age of the lesion and the various complications present. There is plain silicosis, a serious disease in itself that causes disability only after many years exposure. This is characterized usually by a slowly progressing fibrosis, beginning in the hilum lymph nodes and gradually encroaching on the normal lung tissue. The lymph nodes of the hilum become involved because they are the cross roads of lymph currents and accumulate the dust in the greatest concentration. Then there is a gradual backing up towards the lung parenchyma involving the lymphatics along the main bronchi, the finer bronchi and finally the lung parenchyma itself. All this happens because of a blocking of the lymph drainage, so that the silica dust accumulates in the lymph node progressively away from the hilum. The first stage of the disease is when there is an involvement only of these main lymphatic trunks. The second stage is when a few scattered nodules begin to appear in the parenchyma out from the hilum, while the third stage is when these scattered nodules become more or less confluent.

According to Gardner[4], silica particles smaller than 10 m are inhaled into the alveoli and are taken up by phagocytes which carry them immediately up the lymphatic channels from one node to another towards the hilum. The special irritation of silica particle seems to enhance this movement. After locating in the various nodes, the irritation continues and the same type of cellular reaction occurs that is seen in tubercle formation, except the tubercle becomes caseous.

The exact cause of formation of this fibrotic nodule is still in doubt. The old idea of sharpness of particles has been abandoned; likewise has the colloidal theory. Now there is a tendency to regard some form of chemical irritation, but nothing definite has been proved so far.

Lemon and Feldman[6] have recently compared the silicotic nodule to the tubercle, showing that the two are similar in their formation up to a certain point when the tubercle begins to change by assuming a caseous centre due to the toxic effect produced by the growing tubercle bacilli. When the tubercle bacillus is alone, the host has a chance to wall it off and kill it, but when special culture media is prepared as in silicotic nodules, the body has a difficult time in stopping the process.

When a silicosis becomes infected with tubercle bacilli, there is found a silico-tuberculosis. This is a form of the disease that is infinitely worse than pure silicosis. In this complex, there may be a mild, moderate or advanced silicosis on which a tuberculosis has been superimposed. The natural defense of the body has apparently been lowered so that the tubercle bacilli seem to thrive. Furthermore, the fibrotic silicotic nodule seems to be good soil for its growth. There is already a nodule produced, so that nature cannot act to enclose the germ until the whole nodule is filled with germs. The avascular condition of a tubercle is easily produced and soon the whole center is transformed from a silicotic nodule to a caseous nodular tubercle. According to Hoch[5] and others, about 65% of silicotics die of a complicating tuberculosis. Others place the figures higher. The difference between the two diseases is that true silicotics may live from 20 to 50 years, while with a complicating tuberculosis they rarely recover and usually die within a few months to a few years after the tuberculous infection takes place.

The antemortem diagnosis of various phases of silicosis and its complications presents the greatest problem in handling this disease complex. A clinical diagnosis is not certain, for the reaction of people differs greatly to the exposure of the same amount of silica. An absolute early diagnosis of silicosis by the x-ray is impossible. Even moderately advanced disease is difficult to differentiate from many other conditions. One thing is certain, however, an early or first stage silicosis, per se, is not disabling and should not be compensable at any time unless the patient develops tuberculosis. In the event that they die of tuberculosis, the problem can be easily solved by a pathological study and chemical analysis. Should there not be an abnormal silica content and should there not be any silicotic nodules, there is no compensation due. Should there be enough silicosis to enhance the development of tuberculosis, as judged by the pathologist and chemist, there should be compensation. Should the patient not die but linger on, it should be encumbent upon the industrialist to take care of him until he recovers, especially if exposure to the dust was sufficient to warrant a suspicion of silicosis.

The second and third stages of the disease may be handled in the same manner. In this instance there is not the difficulty in making a clinical and x-ray diagnosis, in spite of the fact that many conditions simulate the x-ray shadows of silicosis as shown by Dr. Cook. A second stage of true silicosis may be partially disabling while a third stage always is. The point I wish to emphasize is there should be only emergency or partial compensation until all the facts are known. If death occurs, competent men should decide upon the kind, extent and complication of the disease, when a correct and equitable allocation can be made.

Next to silicosis, anthracosis offers a serious but by no means similar problem. Here there is a different disease entirely. Pure anthracosis causes a long standing passive congestion due to a plugging of lymphatics with phagocytes laden with coal dust. The only fibrosis is a result of this passive congestion. As a result, there is not the tendency to develop tuberculosis. In fact, these people seem less prone to develop tuberculosis than ordinary people. There is more of a tendency to develop local acute infections resulting in bronchiectasis and abscess formation and to have a terminal influenza and pneumonia. When there is complicating silicosis the whole disease may be

evaluated on the basis of silicosis. When there is no silicosis it should be evaluated on the basis of disability produced and the damage resulting from acute infections. This presents an entirely different problem from silicosis or silico-tuberculosis, because the disability is less and life expectancy is several times greater.

There are various other names applied to dust diseases depending on the particular mineral involved. When there is a large amount of iron, the condition is termed siderosis. Pure iron, however, is not unlike coal in its effect. The usual damage is due to an overlapping silicosis and should be valuated accordingly. This is true of many other types as well. The effect of asbestos, cement, carborundum, metal dusts and other such agents must each be similarly determined on the same basis as that proposed above for silicosis and silico-tuberculosis. Until it is done, the field will continue to be racket ridden.

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Discussion

DR. LLOYD ARNOLD, Chicago: I would like to discuss this subject from the standpoint of one in research work. I am wondering in this whole problem whether we are attacking it right. We have a problem here primarily of atmospheric pollution. The atmosphere is polluted with something. The question of dusts has been narrowed down to a few dusts and those must be of a certain size. The physical properties of dust do not seem to carry weight. The largest gold mines in the world are in South Africa and India. The mines of South Africa run about 80 to 90% silicon, while Indian mines run about 95%, and yet silicosis is unknown in India. In the Transvaal there is plenty of silicosis. No precautions are taken in India, as there is no need for precaution. In South Africa all known precautions are taken and yet silicosis is common. Therefore, it is evident that it is a problem of atmospheric pollution. I am wondering if in this problem of atmospheric pollution we are not ultimately going to call in a group of men who are as efficient in the field of dust as bacteriologists are in microscopic life.

Very recently there were some very interesting reports returned by W. R. Jones, a pathologist from Great Britain. He was given the task of analyzing rocks on the basis that in the various mines certain rocks produced a dust which in turn caused silicosis. I am not qualified to discuss rocks but these people who are specialists in that field found that the silicate rock undergoes degeneration into silicate molecules, and the whole field of mica changes are secondary changes from silicate rocks. In these degenerative changes from the basic rocks various types of mica develop and among them is one that has a fibrous-like contour. Mica splits itself off in fine plates, which are all silicate dusts. Jones found in the rocks of the South African mines a secondary mica, called sericite. This was entirely absent in the mines of India. He then analyzed about 14 different areas in the British Isles and found that where silicosis was present sericite was always found. He then analyzed the lungs of individuals dying from silicosis and found that sericite was highest in content. I am wondering if our field would not be better off if we could get the petromicroscopists interested in some of our Illinois problems. Research shows that silicosis is not uniform, and therefore we should determine whether we have not some other things besides silicate deposits responsible for this disease. I think the work of Jones, published in the August, 1933, Journal of Hygiene, was the most stimulating work that has come out in a decade on this problem. I think he is attacking it in the right direction.

In closing, let me say that the State Department of Public Health is quite interested in silicosis. We are interested in the cause and control. How the disease is to be classified legally I do not think is a Health Department concern. We are concerned in trying to institute some methods of control. I think the Health Department would be interested in cooperating with the University where they have men trained in rocks, to undertake some such study as that of Jones, to find out if there is not a parallel explanation at least for some of the cases we are encountering. It is certainly a vague field and if a searchlight shows up somewhere it looks as though it might be worth working out.

DR. R. M. GRAHAM, Chicago: I would like to ask how long an exposure would it take to develop sufficient silicosis to aggravate tuberculosis.

DR. McNALLY: Silicosis can come on in six months or in six years and tuberculosis can come on at any time. Anybody with a lung laden with silicate deposit is a fertile field for any infection, and tuberculosis is just one of those.

DR. C. O. SAPPINGTON, Chicago: I read Jones' article referred to by Dr. Arnold. He describes his methods in detail and is very honest about his contentions. In this country there have been several examples of trial of this method in the attempt to find whether sericite was present in the dust that produced silicosis in cases where it has been actually known that silicosis was present and confirmed by autopsy, and in some instances where it was not confirmed at autopsy. For instance, the work of the Industrial Commission of Massachusetts which was recently put out showed by geological analysis at the Department of Geology of Harvard University that most of these dusts did not contain sericite. Some contained very small quantities. The question was left open.

In another series of cases in West Virginia in which there was considerable mortality, I saw the roentgenograms and knew the case histories. The samples of dust examined by government geologists in Washington showed no sericite present. So it is rather confusing as to just what Dr. Jones' work means. I think until some work can be carried out correlating clinical and pathological findings, corroborated by postmortem, we will continue our present management.

Silicosis

—An Old Disease Revived—

by

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SILICOSIS may be appropriately termed a "depression disease" because in America prior to 1930 little was heard of silicosis, while now, hundreds of alleged cases have come to the attention of the medical and legal fraternities. This disease was known amongst the ancient Greeks, Romans, and Egyptians. Wherever men were engaged in dusty occupations breathing air laden with silica, it is certain that respiratory diseases developed. These respiratory diseases such as asthma, pneumonia, bronchitis, and tuberculosis, with dust inhalation as a predisposing factor, are placed under one general heading, "Pneumonokonioses."

Pneumonokoniosis, a term of Greek derivation, was introduced by Zenker[1], and includes all dust-born diseases which have been given various names for the particular dust inhaled; for instance, "Silicosis" was produced by dust containing silicon dioxide. This is also known as "Miners' Phthisis," "Miners' Consumption," and "Rot"; "Asbestosis" when produced by the inhalation of asbestos; "Siderosis" when the disease is caused by the inhalation of metallic dust; "Byssinosis" when due to the inhalation of cotton dust; and "Anthracosis" when due to coal dust. In older literature other terms are found. F. Oppert[2], 1866, used the word "Melanosis" of the lungs for diseases arising from the inhalation of dust. He also spoke of Red Lung Disease as "Erythronosis," and Blue Lung Disease as "Glaukonosis." Under this latter heading, I believe that he meant typical cases of silicosis, for in advanced cases the lungs have a slaty appearance. In 1845, Makeller[3] wrote in the Edinburgh Monthly Journal on Black Phthisis (induration induced by carbonaceous accumulation in the lungs of coal-miners). Meinel[4] in 1869, proposed the name of "Chalicosis" or "Chalicoconiosis" respectively, as corresponding to the conception of a sand dust inhalation disease.

Hippocrates[5], in his Epidemics, speaks of a metal digger who "has his right hypochondrium bent, a large spleen, and a costive belly; he breathes with difficulty, is of pale wan complexion, and is liable to swellings in his left knee." Here he speaks of shortness of breath, which is invariably the first, and in some cases the only objective sign of damage caused by dust inhalation. George Bower[6] who wrote under the "nom-de-plume" of Georgius Agricola, in his famous work, "De Re Mettallica," published in 1557 (translated from the Latin by Herbert Hoover), mentions asthma due to the inhalation of dust in the blood and lungs: "When the dust is corrosive it ulcerates the lungs and produces consumption, hence it is that in the Carpathian Mountains there are women who have married seven husbands, all of whom this dreadful disease has brought to an early grave." Lohneiss[7] in 1690, referring to miners, describes the effects on them as follows: "The dust and stone fall upon the lungs, the men have lung disease, breathe with difficulty, and at last take consumption." Ursinius[8], in 1652, reported two forms of mountain sickness caused by the inhalation of dust. Little was written upon the subject of pneumonokoniosis from that time until 1717, when Ramazzini[9] wrote his famous book, "Diseases of Tradesman," incorporating his views from a personal investigation of mines and industry. The description he has portrayed of silicosis and other forms of pneumonokoniosis has change but little up to the present date. The names of Bubbe[10], 1721, Leblanc, 1795, and Johnstone[11], 1799, were all aligned to the early history of pneumonokoniosis. Pierson[12], in 1813 applied the term "anthracosis" to lungs containing carbon particles. The first report with a microscopic demonstration of silica was made by Peacock[13] in 1860. In his article, wood cuts were used to demonstrate the presence of carbon and silica in teased sections of the lung. Greenhow[14] examined a specimen of lung from a razor grinder who had died from an intercurrent attack of acute pneumonia. He found crystalline and small angular bodies which, when submitted to hydrofluoric acid, were entirely dissipated.

Very little investigation was made from this time until 1902 when a committee in England, of which Dr. J. S. Haldane was a member, reinvestigated the high death rate amongst Cornish tin miners and decided that, "stone dust which they inhale produces permanent injury to the lung, gradually in the case of ordinary miners, and rapidly in the case of machine-drill men."[15] Two years from that time reports came from various parts of the world. In 1911, a Miners' Phthisis Commission was appointed which issued a report dealing rather fully with miners' phthisis among white miners on the Transvaal. Lanza[16] in 1914, made a study of the disease amongst zinc miners in Southwestern Missouri. In 1916, he made a similar examination of miners in the mines of Butte, Montana,[17] and in 1929, Russell[18] and others of the United States Public Health Service, completed a study of this disease in the granite workers in Vermont. Sayers and his associates[19], of the U. S. Public Health Service, have written a number of articles on silicosis. The outstanding meeting of people interested in silicosis was held at the International Conference at Johannesburg, August, 1930. The papers delivered at this meeting, with the discussion of the same, have been printed and bound in a volume titled, "Silicosis"[20]. Since that time interest has increased in Germany and in the United States.

The Committee on Pneumonokoniosis of the Industrial Hygiene Section of the American Public Health Association[21] defined silicosis as, "a disease due to breathing air containing silica (SiO_2), characterized anatomically by generalized fibrotic

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changes and the development of miliary nodulation in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis, (some or all of which symptoms may be present), and by characterstic x-ray findings." From the foregoing definition of silicosis, one must breathe air containing silicon dioxide, although, as is noted in asbestosis, the inhalation of asbestos, a magnesium silicate, also causes a similar condition.

In determining whether the individual has silicosis, we must obtain an occupational history. The accompanying chart, modified from one given by Hayhurst, aids in keeping a brief office record of this type of case.

ing and leaving the workroom must be noted, as well as the amount of dust per cubic foot of air inhaled, the size of the particles, the amount of organic and inorganic matter and the amount of silicon dioxide in the dust, the length of exposure to the dust, and the number of people affected. The dusts usually causing trouble in the industries are inorganic, and contain varying amounts of silicon dioxide. The silica produces more permanent damage than any of the other material found in the dust. It can be stated, "once a silicotic, always a silicotic." The silica remains in the lungs forever. It is so fixed in the fibrotic nodules that it can not be released unless an infection like tuberculosis intervenes and causes destruction of nodules. Some of the lungs of men who have been

Name ..... Address ..... Date .....

Age..... Sex.....

House .....

Congested House Apartment Light Dampness Heating

Habits (Alcohol, Tobacco, etc.).....

Previous Unemployment Causes .....

Previous Industrial History:

Name of Employers	Address of Employers	Industry	Occupation	Date Begun Work	Date Stopped Work
1.					
2.					
3.					

Present Occupation .....

History of Family:

Respiratory Diseases..... Colds .....

Bronchitis ..... Asthma..... Tuberculosis .....

Temperature of Place Where Working.....

Absence from Work for More than One Day.....

Dusts ..... Nature ..... % Silicon Dioxide .....

Size Particles in Microns.....

Mining ..... Stone Finishing ..... Pottery .....

Quarrying ..... Glass .....

Construction ..... Abrasive .....

Symptoms and Physical Findings—Pulmonary Emphysema .....

Bronchiectasis .....Chronic Bronchitis .....

Respiratory Movements or Decreased Lung Expansion .....

..... Shortness of Breath .....

Wheezing Sounds of the Asthmatic.....

Radiographic Pictures: Ramifying Fibrosis—1. Slight.....

2. Moderate .....3. Well Marked .....

Nodules .....Cavities .....

Laboratory: Sputum..... T. B..... Dust .....

Post Mortem..... Microscopical and Chemical Examination Mg. SiO_2 per gms. dried lung .....

Industrial Hygiene—Silicosis

Where dust is advanced as an etiological factor in causing diseases of the lung, an inspection of the plant, workshop, or place of employment must be made. The number and size of doors, windows, kind of ventilation and the cubic feet of air enter-

away from their dusty employment for 15 years show large amounts of silicon dioxide.

The damage that is done to the lung, we believe, is due to the action of the fluorides in the blood attacking the silicon molecule and the soluble sili-

con tetrafluoride causing fibrotic changes. The former theory that it was the hardness and sharpness of the silicon dioxide particles that alone produced the chronic pathological conditions has been abandoned. Nevertheless the mechanical and physical factors of the difficult soluble silica, play an important role in causing diseases of the upper respiratory tract. Collis[22] has stated that, "dusts appear more injurious as their chemical composition differs from that of the human body, or from elements of which the body is normally composed."

Silicon dioxide is a common constituent of all our food, whether of animal or vegetable origin. It is found in the air we breathe and the water we drink. Green[23] reports 119 tons of material (containing by chemical analysis 77% ash) per square mile per month, deposited from the atmosphere in a collection station in the downtown district of Cleveland, Ohio. The Chicago Board of Health reported in 1931 that there was an average fall of silicious matter of 134.03 tons per square mile per month. In 1932 there was a fall of 129.30 tons. with the smallest amount (63.127 tons) recorded in 1925. The average silicon dioxide content of Lake Michigan water is 3.3 parts per million. According to Thoulet [24], ocean water contains more silica than fresh water, the amount being 0.0149%. It is also a normal constituent of our blood and all the tissues of the body. Quantitative examination of foetal lungs show the presence of 0.11 mg. SiO_2 per gram of dried tissue. In other words, we start to accumulate silicon dioxide in the lungs before birth.

Method of Collecting Dust

VARIOUS methods have been used in collecting samples. We formerly used the sugar-tube method, supplanting it by the Palmer water spray apparatus. The Bureau of Mines at the Pittsburgh Station[25] made comparative tests of the various methods in use and a new instrument, the Impinger, was evolved. "In this instrument, the air to be sampled is drawn through a glass tube and impinged at a high velocity into a graduated tube containing water. The dust is momentarily arrested, wetted by the collecting fluid, and in this manner trapped. The apparatus possesses an efficiency of 94 to 97.5% when sampling finely divided silica dust suspension at the rate of one cubic foot per minute." A portion of the collecting fluid is removed to a Sedgwick Rafter Counting Cell for microscopic count to determine the number of particles present. An eye piece micrometer known as a "Whipple Disk" can be placed in the eye piece of any microscope in making the counts. The great objection to this form of apparatus is the weight, as one person cannot carry both parts of the apparatus and tripod.

The dust count should not exceed 10,000,000 particles per cubic foot when collected by the Greenburg Impinger Method, and counted with about 110 diameters magnification. This is equivalent to 300 particles per cubic centimeter (referring to silica dust exposure). This is a standard used in South Africa, Ontario, Wisconsin, and Oklahoma.

In South Africa, the degree with which an individual is affected with silicosis, has been divided into various stages: "1, rather more fibrosis than usual; 2, more fibrosis than usual; 3, ante-primary; 4, primary; 5, secondary."[26] In the United States, the stages are called first, second, and third. "The first stage means that definite physical damage to the lungs has been found and that such damage has resulted from exposure to dust. The second stage means that definite and specific physical signs of silicosis are or have been present and that capacity for work has been impaired by the disease, though not seriously. The third stage means that specific physical signs of silicoses are or have been present, and that capacity for work has been seriously and permanently impaired by the disease."[27] The first two degrees, under the African division, leave a loophole for more litigation. The first important step in eliminating racketeers is to have the doctor agree on what is silicosis, also what is the percentage of impairment in the patient, what percentage of silicon dioxide in the dust causes the disease, and what degree of impairment is compensable, and then set the engineer to clean up the plant. Let the lawyer be the last to enter the picture.

Symptomatology

IN ANY dusty atmosphere there is an irritation of the mucous membrane of the nose and throat, with sneezing and coughing to remove the inhaled particles. The particles that are retained are attacked by the bronchial secretions which dissolve some of the dust particles. The smaller particles are taken up by the phagocytic action of the macrophages which remove the particles from the alveoli or through the alveolar walls. The cough is usually the first symptom. At first, it is both paroxysmal and unproductive, later it is accompanied by a scanty expectoration. Later and often, the outstanding symptom is dyspnea. As the fibrosis increases and reduces the lung ventilation this symptom becomes very marked. The sputum may be stained with the kind of dust inhaled, the chest expansion is diminished, the breathing becomes more labored and may be wheezing or asthmatic. In a later stage, there is pain in the side which is probably due to an early pleuritis. There is an absence of fever, night sweats are uncommon, there is little or no loss of flesh. The patient as a rule is pale in appearance. The chest is usually flattened anteriorly. On auscultation, the breath sounds are unusually efficient in intensity. In early cases it is extremely difficult to distinguish in the physical examination from those of tuberculosis and here we must depend upon radiographic examination for the presence or absence of tuberculous infection. And it is here where the experts differ so much upon whether silicosis caused the tuberculosis, or the tuberculosis was present with the silicosis implanted upon it. No method of clinical diagnosis can distinguish between a case of affected fibrosis and one of simple fibrosis. Haemoptysis, loss of strength and gastrointestinal symptoms are pronounced in the more advanced cases. However, when a diagnosis of silicosis is made, the withdrawal of the patient from the dusty atmosphere should suspend any further increase in the pathological condition. Both diseases may be present, and the term "tuberculo-silicosis" has been applied to this condition. Cavities have been reported in cases of silicosis without tuberculosis. Where there are no cavities one of the outstanding clinical findings would be a reduced vital capacity. That is, the volume of air that can be expelled from the

lungs after a full inspiration would show a reduction from the normal.

Diagnosis

UNDER diagnosis, it is absolutely necessary to have a history of the exact occupation and exposure of each workman in the silica-containing dust, to have a complete physical examination with the symptoms, and to have x-ray pictures. "Just as in the case of bronchitis, the connection between the disease and dust inhalation must depend upon an intimate knowledge of the occupation followed, of the exposure to dust, and of the mortality prevalent in that occupation. A correct diagnosis is of importance because, with the known tendency to a fatal termination, every case from its onset however apparently slight must be considered serious and treated accordingly. Detection in the sputum of particles of dust known to be associated with pneumonia may assist in diagnosing the occupational sign of the attack."[28] However, Policard and Magnin[29] conclude "that the microscopic and chemical examination of the sputum is no aid in the diagnosis of silicosis. They only confirm etiological data much more easily obtained in some other way."

When the individual dies and material is removed at the autopsy, the pathological and chemical examination is the final word whether or not the case is one of silicosis. The history, the x-ray and clinical findings are subordinate to these findings. Of course we cannot wait for the individual to die, but this suggests immediately to insurance companies that no lump sum settlements should be made in cases of silicosis, but monthly payments with a proviso that in case of sudden death an autopsy be held and the lungs be examined by chemical and microscopical methods for evidence of disease caused by inhaling dust. In Tables Nos. 1 and 2 are given analyses of normal lungs and lungs of people having had various degrees of silicosis. Table No. 2 is of interest, as it gives the occupation of the individual and the reports of investigators from various parts of the world.

Case	Age	Ash %	Mg. of SiO_2 per Gram of Dried Tissue
579	6 Mos. Foetus	1.05	.11
580	2 Days Old	5.32	.50
590	3 Yrs. Old	5.21	.21
806	5 Days Old	3.20	.12
596	Full Term	5.36	.077
311[1]	81 Years	6.71	1.86
312[1]	63 Years	5.61	.92
441[1]	40 Years	6.17	1.21
15[2]	51 Years	9.85	.72[3]
17[2]	43 Years	5.53	1.90
18[2]	28 Years	3.50	.80
6[4]	23 Years	4.77	1.10
16[4]	72 Years	4.40	1.10
1[5]	Normal		1.40 (Colorimetric)
2[5]	Foetus		.09

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Table 1. Analysis of Normal Lungs

Case	Author	% SiO in Dried Lung	Remarks
1	Giese[1]	2.24	Stone cutter
3	"	7.98	Miner
5	"	3.50	Foundryman
8	Hackman[2]	2.35	Miner
14	"	3.12	Stone cutter
30	"	5.53	Miner & stone c.
1	McCrea[3]	1.39	African gold m.
4	"	4.47	African gold m.
6	"	2.81	African gold m.
503	McNally[4]	1.40	Mill stone sharp.
300	"	2.60	Granite cutter
446	"	1.09	Zinz miner
1	Pancoast & Pendergrass[5]	1.81	Sand blaster
4	Pancoast & Pendergrass[5]	2.45	Sand blaster
40	Sladden[6]	1.72	Coal miner
41	"	1.78	Potter
42	"	1.80	Coal miner
1	Smith & Wikoff[7]	2.16	Driller
4	" "	2.69	Driller
6	" "	1.98	Laborer
3	King, Stantial & Dolan[8]	3.64	
4	King, Stantial & Dolan[8]	1.70	
5	King, Stantial & Dolan[8]	.81	

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Table 2. Typical Analysis of Lungs of Workers In Silica Laden Air

Prognosis

THE prognosis is not good. As previously stated, the silica once lodged in the lung remains there forever, and the lung tissue is never restored to normal. Susceptibility to pneumonia and tuberculosis is increased in all stages of silicosis, especially in the last stage.

Pathology

UPON opening the thoracic cavity there are usually dense adhesions and it is with difficulty that the thoracic organs can be removed. The adhesions are usually adherent on the lateral, mediasternal and posterior surfaces, with more extensive adhesions from the latter surface. The lungs are not collapsed but stand out as if a cast had been made. The lungs are not much increased in size, but show an increase in weight. On section, the lung of a typical case of silicosis will show a dull slaty gray, the surface uniformly studded with discrete firm black nodules. The air spaces are emphysematous. The large bronchi are thickened by fibrosis. The peribronchial lymph glands along the bifurcations of the large bronchi are enlarged and black in color and upon section

cut with difficulty and give a gritty feeling. The cut sections are gray with areas of black scattered throughout. The lung cuts with difficulty and may show irregular spherical masses of dense fibrous tissue scattered over the lung surface.

Microscopical

THE pleura is nearly always thickened and contains deposits of dust. The interlobular septa are thickened and contain dust. The primary lesion of silicosis is located in the tracheobronchial lymph nodes and a chemical analysis of a large number of lymph nodes show increased amounts of silicon dioxide as the disease advances in the lung. The nodule is characteristic and pathognomonic for silicosis, consisting of a discrete mass of hyaline connective tissue surounded by layers of fibrous tissue. In some nodules the hyaline material will contain dust, in other sections there will be no dust.

[The changes that take place when tuberculosis intervenes will be taken up in detail by Dr. Henry Sweeney. (See p. 58).

Summary

SILICOSIS is not a new occupational disease, but has been brought into prominence by the period of unemployment.

2. A very complete survey and dust count should be made of every industrial plant to make recommendations for minimizing this hazard.

3. Silicon dioxide is a common constituent of the air we breathe, the food we eat, and the water we drink. It is found in all the tissues of the body.

4. A new theory is advanced, that the fibrosis in the lungs in silicosis is caused by the chemical action of the sodium fluoride in the blood, upon the silicon dioxide. Silicon dusts become more harmful as the amount of sodium flouride is increased in the dust.

5. A chemical examination of normal and silica laden lungs is given for comparison.

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The Prevention of Silicosis

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IN THE prevention of any occupational disease due to an exogenous substance certain basic principles of industrial hygiene must be recognized. The prime factor is the reduction of the concentration and total amount of the substance to which the worker is exposed. Thus, in silicosis the ultimate goal of preventive procedures is the maximum reduction of the concentration of silica dust in the inspired air.

Mavrogordato, in his extensive investigation of the problem of silicosis prevention in the South African Mines, has most definitely demonstrated that the degree of concentration of air-borne dust determines the characteristics of the resulting disease; its type, its prevalance, and the duration of exposure required for its production. He has derived certain critical levels of concentration which are of great significance. Critical level "A" includes any concentration above 20 mg. per cubic meter of air. Critical level "B" includes any concentration between 5 and 20 mg. per cubic meter. And critical level "C" any concentration between 1 and 5 mg. per cubic meter. Above 20 mg., i.e., level "A," a considerable increase in concentration does not affect the type or incidence but does affect the duration of exposure required.

The provisional conclusions that one can draw are:

1. A decrease to 20 mg. must be attained before any improvement at all can be obtained. Silicosis-producing dust is not effectively removed until this level has been reached but even at this stage there is a high incidence in a grave form, becoming particularly frequent after six years of exposure.

2. At critical level "B" a great improvement is secured. It is at this level that silicosis-producing dust is first removed to a partly satisfactory degree. Although incidence is still formidable at this level, it is about one-half of that associated with level "A," and does not reach the 10% production mark even with men of longstanding service.

3. At the present time, proportionate improvement beyond this point has not been attained, undoubtedly because a critical level lower than "C" has nowhere been realized.

4. Critical levels can thus serve as excellent indices of health conditions.

Dust in underground mining operations can be divided into two classes, (1) income dust (dust

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made daily by rock cutting or blasting) and (2) capital dust (a body of dust always circulating about the mines). The preventive measures have been directed chiefly to the control of income dust. If blasting, a source of silicosis-producing, is permitted only once in 24 hours, there is opportunity to clear the mine of the resulting income dust. Wetting is another method, the advantages and disadvantages of which will be discussed later. Improvement in machinery has increased the stone production, thereby decreasing the number of men exposed and, as a result, the incidence of the disease. Another important factor has been the improvement in the technique of ventilation, aimed toward the removal and dilution of dust. All these factors have reduced income dust.

Now, with regard to the control of capital dust: The presence of capital dust indicates a cumulative failure to remove income dust. To indicate the significance of this point, it is only necessary to state that the accumulation of capital gas in a coal mine would necessitate the abandonment of that mine. Furthermore, if mine air is to be utilized to force out capital dust, it must be reconditioned or fresh air. On the South African Rand, the air used for ventilation carries from 1 to 1½ mg. of dust per cm. This is far in advance of anything previously obtained. However, there is still a need for yet greater reduction, to be realized only by an attack on the capital dust concentration.

It has been found that dust concentration has been below the critical level "B" for the past 10 to 12 years and that even this 2 mg. level (300-350 cc lightground or 8 to 900 darkground conimeter counts) is still associated with silicosis production. It appears that there must be an hypothetical critical level "C" below which a person is safe from developing silicosis for a reasonable working life. Two variables are concerned which make exact definition of this level difficult. Not only must the concentration of dust be considered, but also exposure to infection by tuberculosis must be taken into account. There is no doubt that dust facilitates tuberculous disease and that tuberculosis predisposes to silicosis. Contact with open cases of tuberculosis is, therefore, an important factor in the increased incidence of tuberculosis and ultimately silicosis. A third factor is probably of significance, namely the spread of tubercle bacilli by water droplets in places where the wet method is used. The way of salvation lies in working dry, in adequate currents of clean air, and with efficient means of catching the dust at its source of production.

Segregation of an industrial process is often found to be an effective method of prevention. By this method workers that are not engaged in the actual process which produces the dust are not exposed to its effects. Water may be of value when applied to the point of origin of the dust, but, as stated previously, the hazard of Tbc droplet infection should not be overlooked. Mechanical handling of material is an aid in the reduction of dust concentration. Blasting and other dusty operations should be delayed until the end of the shift. Exhaust systems are of aid but they require intelligent supervision and maintenance. Respirators should never be regarded as substitutes for exhaust systems. When air masks are used an adequate air supply which is dust-free should be afforded.

Medical supervision is of great importance in the control of any silicosis program. Physical examination before employment and at regular intervals should be routine. In addition, a carefully obtained industrial history and x-ray examination are, of course, essential. A worker suffering from silicosis should not be allowed to work at any dusty occupation.

Dust counts should be made periodically in any place where there is exposure to silicosis-producing dusts. Finally as medical men we should insist that dust be reduced to a minimum and we should not be satisfied even with that minimum. We must remember that silicosis is a disease in which prospect of recovery is not favorable—hence, we must interest ourselves in its prevention.

[NOTE: The Bureau of Mines recommends that the dust count should not exceed 10,000,000 particles per cubic foot when collected by the Greenburg impinger method. This equals 300 particles per cm. Dr. Russell of the U. S. Public Health Service recommends a dust concentration between 9 and 20,000,000 particles per cubic foot of dust as a safe limit. This, of course, is a granite dust with about 25-30% of free silica. Oklahoma limits the industrial processes to 300 particles per cubic centimeter, and New York State allows 10,000,000 per cubic foot. The standards in these agree with the South African Standard discussed in this paper.]

"Big Bad Wolf"

DO YOU realize, gentlemen, the medical powers of our state could have framed a compensation law that would have been fair to the employer, employee and carrier? Alas, it was the old story and the wolf, in the shape of the big insurance companies, slipped in and devoured Little Red Riding Hood—the doctor. Think of the ridiculous fees you are receiving from the insurance companies for compensation cases. Make 10 house calls, and send in a bill for $20. Just $2—the amount a newly-wed, in a fit of absent mindedness, left on his wife's bureau as he went out in the morning. All right. What happens when the corporation receives your bill for the $20? More than likely they will send you a check for $12 or $15, adding that if not pleased there is a man in Brooklyn who will do the work for 50c a call. The fact that such a statement was made, and that more than one are ready to work for 50c, I can vouch for. You will be interested to read "The Doctor at Fifty Cents a Day," in the September (1934) *New York Physician and Private Hospital.* * * * Who benefits by health insurance? No one but the insurance companies, while you and I beg for a handout of work or resort to cutthroat competition to obtain it. Don't forget either, that huge money is behind the bills for insurance medicine; 120 millions that we know of in one instance. Powerful lobbies and the cleverest of agents, with tons of subtle propaganda, will fill all space available to the public eye. Even the myopic doctor will see it. If you accept health insurance, the same deplorable conditions that now exist in compensation work will be evident in every aspect of medical and surgical science. Has not the present economic crisis dragged the physician deep enough into the abyss of despair?"—Dr. Winfield Scott Pugh, talking to the Society for Socialized Medicine, *American Medicine.*

Some Medicolegal Phases of Silicosis

—With Special Relations to the Complexity and Importance of the Silicosis Problem—

by

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TRUTH may be stranger than fiction (according to the old adage) but certainly fiction is no stranger to truth, as judged by recent medicolegal experiences. The force of this statement will be apparent as the subject of this paper is developed.

Before going into details regarding the medicolegal phases of silicosis, it may be well briefly to review the conditions which preceded our present situation.

A resume of the compensation laws of the various states shows that the original laws were written for the purpose of compensating the employee in case of injury. The manufacturer was thus required to provide for the treatment, rehabilitation, and finally the prevention of accidental injuries; the incentive thus produced caused the development of traumatic surgery and a continuous increase of our general knowledge on this subject. Physicians everywhere became interested in this type of work, because of the demand on the part of the manufacturers.

No such incentive, however, has been provided in the case of occupational diseases. Because of the relatively few men specializing in this kind of work, many cases of occupational diseases have gone unrecognized where reporting was required; because in most instances no reporting has been insisted upon, there has been no adequate measure of the occurrence of occupational diseases, and hence those in charge of the administration of compensation laws came to the conclusion that the frequency of such diseases as well as the financial outlay involved, amounted to very little.

This was the apparent situation, when the financial depression began. With the necessity for economic readjustment and because of consequent unemployment following the period of financial depression, an increasing number of actions for damages has been recorded. This has been chiefly centered around silicosis. The majority of these claims have been spurious and arise from the erroneous opinion, shared unfortunately by laity and medical profession alike, that any type of dust in any amount of concentration will actually produce silicosis.

A review of the present situation with regard to silicosis claims shows that there is a lack of understanding regarding industrial exposure and consequent pathology, when filing such claims. The relationship of pneumoconiosis and silicosis does not seem to be very well understood by persons who file claims, by their physicians and by their attorneys. In many instances silicosis is claimed on clinical evidence which in no way differs from that of normal persons who are symptomless and without disability. The role of mixed dusts in the production of pathology is also misinterpreted in many instances, it being assumed that any type of dust, in any concentration, as before mentioned, can produce silicosis.

Application of Knowledge to Medicolegal Issues

FOR any adequate medicolegal application of our scientific knowledge, it is necessary to have an appreciation of the exposure factors, the clinical and roentgenographic findings, as well as a knowledge of the pathology of silicosis. It is not my intention to review either the pathology, or the clinical and roentgenographical findings, which have been so well demonstrated by Drs. Hayhurst and McKay. A much neglected phase, however, is the attempt at the evaluation of the severity of the exposure in a dusty atmosphere. A brief outline of this material will, therefore, be given.

There is a definite relationship between the quantity and quality of dust in the breathing atmosphere and the pathology produced by inhalation; the amount retained is also of some moment, as well as the estimation of injurious dust in lung tissue after death.

Most important of the environmental factors in dust exposure are these four; concentration, particle size, mineralogical composition, and length of exposure of the employee in terms of years.

Before any of these factors can be properly determined, however, it is necessary to associate with them information gained through a physical and hygienic survey of plant conditions and an occupational analysis of the employees concerned. These procedures will provide information on which one can actually base an adequate estimate as to how many samples of air are needed and as to where they should be taken in the different plant locations with reference to various processes, to give a fairly adequate measure of the severity of exposure.

After obtaining these data, the most important and probably the most difficult task is then encountered, namely, the interpretation of the information and the comparison of the data obtained with criteria established in previous studies, through which comparison may be gained an assessment of the severity of the exposure in any given instance.

Other points which are important in considering conditions under which silicosis can be contracted are previous exposure and occupational history, the great difference in occupational duties involving processes and methods, and, finally, the evaluation of the efficiency and maintenance of protective mechanisms.

As Dr. J. J. Singer, of St. Louis, has summed it up, it is absolutely impossible to go on the witness stand and say that a certain case is silicosis without knowing whether the man has worked in an atmosphere where silicosis is possible.

If then, the burden of proof rests on the plain-

* Presented at American Association of Industrial Physicians and Surgeons, Nineteenth Annual Meeting, Cleveland, Ohio, 1934.

tiff, as is usually agreed in legal procedures, it is necessary for the plaintiff to establish evidence proving that the exposure during his occupation was of such a type that he could have contracted silicosis; that this exposure actually occurred within the plant of the defendant and not some place else; that the clinical and roentgenographic evidence definitely admits of a diagnosis of silicosis; and that the disease was contracted unlawfully. Furthermore, it must be established that the plaintiff is so disabled by the condition which he alleges, that the judgment for which he prays represents the severity of his disability.

Court Procedures

IT IS not my intention in any way to criticize intelligent members of the legal profession nor to cast any reflection upon court procedures. However, there are a few points which will bear brief consideration in an attempt to show the picture encountered in the trial of silicosis cases.

In the selection of the jury, no one of course could be chosen who professes the slightest degree of acquaintanceship with silicosis or with any of the industrial conditions which may give rise to it. This of course would be interpreted as a prejudicial opinion or preformed judgment. Consequently we have 12 men sitting on each case, holding the fate of the plaintiff and defendant in their hands, without any of them having the slightest information concerning the issues upon which they are to make their decision.

Coupled with this condition we have an almost unending series of continuous arguments regarding the admissibility of evidence, associated with an exchange of verbal barrage by both sides on cross examination and re-direct examination of witnesses. The rules for the admissibility of evidence have long ago been agreed upon by the legal profession and it is not a criticism of these that I am in any way approaching. However, from all of this mass of conflicting emotional display, the innocent and unsuspecting juror is expected to separate the real important grains of evidence involving a highly technical problem such as this is, and decide the case in a manner befitting the dignity of the law and its great traditions. Needless to say, this is a task which is really as difficult as the mythical Atlas encountered in bearing the world upon his shoulders.

The Employer's Liability

THE employer's liability in these cases should be thoroughly understood, whether there is a compensation law which covers the issue or whether it comes under the common law.

Hirth, for example, believes that under common law liability the employer must provide reasonable protection for employees; there is always a question of knowledge of the existence of a danger to employees, particularly as to when the employer became aware of the hazard. Likewise, there is a question of what reasonable care is, but this is a point for the jury to decide.

Where the liability is statutory, failure to conform to the law is recognized as negligence on the part of the employer. Because of the great difficulty in the various states consequent upon differences in the compensation acts and the occupational disease laws, it is suggested by Hirth that lay juries be eliminated from doing this type of work because experience has shown that the efficiency of commissions has gradually improved in the handling of cases, and furthermore that cases under commission jurisdiction can be recalled and disability rating and compensation be revised, if found necessary.

McKenna also notes the differences in these two systems and comments favorably upon the commission type of hearing. Further reference will be made to this later in the discussion.

According to Hirth, the defense program should partake of the following principles: (1) a definite legislative policy; (2) proper study of cases; and (3) the elimination of the hazards.

A brief outline of the present laws might also now be considered. Workmen's compensation laws covering occupational diseases exist in only 11 states, three territories, and the District of Columbia, but none of these specifically mentions silicosis or other pneumoconioses.* Five states of the group of 11 (Illinois, Minnesota, New Jersey, New York and Ohio, as well as Porto Rico) have scheduled such occupational diseases as shall be compensable but have not listed silicosis. Therefore, silicosis and allied diseases are not definitely compensable in those states at present.

In the remaining six states, and in two territories and the District of Columbia, compensation laws rate occupational diseases under a general coverage, or through an interpretation of the words "personal injuries arising out of the employment" unqualified by any requirements that such injuries shall be "by accident." In this type of law, silicosis might be considered a compensable occupational disease in California, Connecticut, District of Columbia, Hawaii, Massachusetts, Missouri (where occupational diseases may be covered optionally under the workmen's compensation act by mutual consent of the employer and employee) North Dakota, Phillipine Islands, and Wisconsin. The United States Civil Employees' and Federal Longshoremen's and Harbor Workers' acts are of similar types. In fact, silicosis, and especially silicosis accompanied by tuberculosis, has for some years been the subject of compensation awards in California, Connecticut, Massachusetts and Wisconsin, but in the latter three states at least upon terms and conditions not yet definitely established.

It is not the purpose here to review pending legislation and the anticipated changes in a number of states, since that is a subject too large to be considered in this paper.

The Insurance Angles

ONE must not forget that in addition to the physician, the employer, the employee, the attorneys, and any others who may be interested in following the course of these problems, the casualty and indemnity insurance company has assumed a very important role. The present situation in regard to such companies is a very pressing economical one.

Stated briefly, the manufacturer who is not in a position to carry his own occupational disease insurance is confronted with a very difficult problem in finding someone who will carry it for him because the carrying companies have been suffering considerable loss in this kind of coverage and

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* This information and that which is to follow has been taken from a report of the Committee on Pneumoconiosis of the American Public Health Association, October, 1933.

are loath, therefore, to accept future coverage unless the employer complies with strict regulations which are sometimes so expensive that it is impossible for an agreement to be made. The brokers and the insurance agents are thus considerably put to it because of the refusal of the carrying companies to continue to write new business. This results in a jumble of relationships and a thoroughly inefficient system of dealing with a difficult situation.

This condition has largely come about because of the present practice of following former methods which were used to evaluate the severity of injury hazards through means of visual inspection only, and the application of this method to the rating of occupational disease hazards. Of course no one, even of expert training and experience, can look at the air and tell how much lead or chromium vapor there is in it, nor can he, by seeing a cloud of dust, estimate the quantity and quality of the dust with the view of obtaining information concerning the relative hazards presented.

Clearly, the more closely we approximate the scientific appraisal of the severity of any potential occupational disease hazard, the better will be the results and the more intelligent the underwriting. Unless competent progress is made along this line, it is quite likely that a considerable number of carrying companies will give up this type of insurance and leave it to the larger companies who can cover such losses by other income.

Legal Experiences

OCCURRING second in importance to getting proper consideration of the facts by the jury, is the difficulty of transmitting information to attorneys, to be used by them in court procedures. From my personal observations, (and this must be the same experience of others) I have found that no two attorneys approach any given case in exactly the same way, although the cases may be very much alike.

One must admit that the attorney can learn a great deal from the physician; but one must not forget that the physician can learn a great deal from the attorney. There should be more of an organized attempt at cooperation between the two professions, similar to that which has been attempted by the California Bar Association and the California State Medical Association.

In many instances, noted at conferences as well as in court, the attorneys apparently have great difficulty in getting answers which are suitable and adaptable to their needs. This difficulty involves the transmission of scientific medical data into precise mechanistic conceptions—the transmutation of biological observations into the field of expression of precise mathematical accuracy.

Even where the physician has had the opportunity to acquire standardized legal training, the situation is little mitigated. Perhaps it is too much to expect in one short lifetime that any one person shall have acquired medical and legal experience in sufficient quantity and quality to cause a just appreciation of the fine points in the practice of both professions. Nevertheless there are a few such unusual individuals.

It is encouraging, however, as noted above, that two such professional groups in California have arranged special meetings to discuss the problem of the physician as an expert witness and to outline procedures designed to make the valuable services of both groups capable of greater reciprocation. If other bar associations and medical associations could be stimulated to take similar steps, such local and geographical nuclei might easily form the background for the inception of an active and virile national medicolegal organization. Such a consummation would redound to the benefit not only of the two professions, but also greatly to the advantage of industrial employees and employers.

Recognizing that the legal profession in trying many different kinds of cases must possess and know how to use a vast amount of general knowledge, if one were to make a suggestion for an improvement, probably he would say that the greatest improvement could be made in spending more time and care in the preparation of cases.

As an illustration of this point, I remember very well an old Scotch attorney who was defending a case of silicosis; he began to make preparation for this case six months before it was supposed to be called, addressing himself assiduously to the task of reading every piece of literature that he could acquire on the subject; previous to the time that the case was called he held several conferences and expressed to several physicians his understanding of the points involved in the case; it was evident from his conversation that he had made a thorough study of all angles of the subject, and although I have had the fortune to be associated with some very fine legal firms, I consider that this man knew more about silicosis before he went to trial than any other attorney whom I have ever met. The result spoke for itself: he won his case. He had the reputation among his confreres as being a "one case man."

Of course all lawyers cannot be of this type. And I also realize very definitely that in many instances the time for preparation is exceedingly short; under the most favorable circumstances I sometimes wonder how a busy practicing attorney can get as much grasp of a highly technical subject as he apparently does.

Etiology of Silicosis

ALTHOUGH this subject has been previously considered, it is necessary to go into it here because of its relationships to medicolegal problems.

As Lanza has very well remarked, the primary cause of silicosis is free silica inhaled in the form of dust; this dust must be in a fine state of subdivision; in fact, less than 10 microns in greatest diameter, although most of the dust penetrating the alveoli is less than five microns in diameter.

The allowable concentration and the percentage of quartz in the dust has been commented upon frequently and in various studies; the U. S. Public Health Service has worked out criteria by which comparisons can be made with any given problem in industry.

Although the concentration is important, the particle size also of some moment, and the exposure in terms of years worthy of consideration, the present conception concerning the danger involved in the exposure to dust is largely based upon the mineralogical composition of the dust, or its quartz content. This is believed to be at present one of the most important etiological factors.

A great deal of discussion has arisen since the publication of an article by W. R. Jones in August, 1933, in the *Journal of Hygiene*, of London. In this paper, Jones places the responsibility for the cause of silicosis on a mineral known as sericite (hydrated silicate of aluminum and potassium) rather than on the quartz content of inhaled dust which has generally been regarded as the principal causative factor. The study was done through the Geological Department of the Royal School of Mines in London, and described the investigation of mineral residues from 29 lungs of persons whose deaths had been certified as due to silicosis. In reading this article, one gains the impression that Jones' work has been very thorough, and he repeats the detail of all the technique, so that the experiments may be performed by someone else.

No published comment refuting or confirming this claim has yet appeared, so far as is known. A number of opportunities, however, have occurred in this country to have dust petrographically examined for sericite, where death has resulted from silicosis. In a number of these there has been no confirmation of the presence of sericite in the dusts.

Haldane, the eminent British physiologist, engaged in debate with Jones on this subject, and contended that his belief was still sound in the fact that silicosis was produced by quartz rather than by sericite.

In conversation with geologists, the question has been raised as to whether sericite can be separated from other fibrous types of minerals, of which there are a considerable number, so that the actual blame can be put upon sericite alone. The point involved is that the refractive indices of a number of fibrous minerals are either the same or so close together that petrographic identification and separation would be impossible.

It seems reasonable to say that, to scientifically trained men and to those in the medical profession who are constantly demanding proof and well-weighed evidence, the conception of Jones, interesting as it may be, awaits the prosecution of properly planned research on experimental animals where known exposures of sericite material as compared with quartz dust can be used and the pathological lesions critically evaluated, thereby obtaining the true answer. Until this can be accomplished, as in other matters pertaining to medical research the sericite idea remains a theory.

Discussion

THERE is a great deal more to be said about this subject, but lest someone gets the idea that this paper is going to expand into a monograph, a brief conclusion will now be given.

There are many different ideas presented as recommendations which might improve the present situation. One which has been suggested is the inclusion of silicosis under the compensation laws of the various industrially developed states. Surely inclusion under the laws would permit of greater control, would be a great deal more fair both to employer and employee, and would provide an incentive to the development of preventive measures in much the same way that the prevention of injuries has developed since the writing of compensation laws.

It should be well borne in mind, however, that medical control and advice will still be necessary after the inclusion of the disease under the laws, in the determination of the impairment of working capacity and also because gradual education is liable to bring about an increased number of claims.

As a matter of fact, compensation is not the final answer to the problem. As well stated in the report of the Committee on Pneumoconiosis of the American Public Health Association in October, 1933, the real point of distinction between European and American compensation laws is that the former place the emphasis on prevention. Without medical and engineering control measures, therefore, financial relief as provided for by compensation laws must be regarded as a temporary palliative only.

Another suggestion to be used, either in conjunction with compensation laws or as a special provision, is the setting up of a special board of experts who shall be constituted as a final authority in disputed cases, or as the body to make the original decisions. Various ideas have been promulgated in relationship to this suggestion, particularly regarding the personnel of the board; it certainly should be composed of persons who have had special training and experience regarding silicosis, and, inasmuch as occupational diseases are assuming greater importance and will probably be more important in the future, such a board might well be selected from persons who have made a special study of, and have had the proper training in, this field.

Whatever system is finally adopted, improvement can surely be made. There will always be a demand for serious consideration of the differential diagnosis of industrial and non-industrial diseases. This principle, therefore, should be kept well in mind in the selection of personnel of specialists, either through temporary appointment by the courts or when functioning as a board to act in conjunction with compensation laws.

I like to think of this problem of silicosis as what I call a "top" problem; this means that no less a person than the chief officer or president of any corporation should take the responsibility for the proper handling of it; too often in the past this problem and other occupational disease problems of serious import have been delegated to subordinates whose chief duty it has been previously to supervise problems regarding the safety of the employees, in which the principles are a great deal more simple and more easily applicable, as well as more easily productive of a successful outcome. I believe, however, that many executives are realizing that the complexity and economic importance of the silicosis problem entitles it to its due consideration by them.

Finally, I must confess that I believe there is a great deal of hope for all parties who are earnestly and honestly seeking a real solution of these problems; perhaps a national occupational disease institute devoted to the correlation of research of industrial exposure, animal experimentation and pathology, clinical and roentgenographic findings, and eventually the application of all of these to medicolegal and compensation issues may be the real settlement. In these days of subsidization, it is quite possible that the problem of silicosis might well be subsidized, to the benefit of a great many

persons who are now struggling under what seem to be insurmountable difficulties.

Summary

SOME of the medicolegal phases of silicosis have been discussed, without any attempt to cover the subject exhaustively.

At the risk of reiterating the obvious, it should again be stated that for any adequate medicolegal application of our scientific knowledge regarding silicosis, it is necessary to have an appreciation of the factors relative to industrial exposure, the clinical and roentgenographic findings, as well as knowing the pathology.

The method of handling the adjudication of silicosis cases is not so important as the correct observance of a number of principles involved. One of these basic principles is to so arrange it, that fairness will be meted out to all parties concerned, namely, the employee, the employer, the insurance carrier, and the physicians and the attorneys. The best points in the systems used by other countries may well be critically surveyed, with a possible plan in mind of adapting them to our usage.

The employers must thoroughly understand what they are supposed to do; their responsibility and attitude in their problems is of great moment and cannot be taken lightly.

The suggestion of a centralized occupational disease institute, which shall act as clearing house of information regarding the furnishing of recent advances which can be directly applied to practical industrial problems, is a thought worthy of mature deliberation. Whether this idea finally is to be applied or not matters little, as long as some definite arrangement be made for a similar source of informational material.

In conclusion, the problems surrounding the silicosis situation demand the earnest cooperation of all the individuals and groups interested; the securing of the best brains and thought that can be mustered; and last, but not least, the sane and level-headed application of all of the available sound and scientific knowledge we possess.

Some Pregnant Paragraphs

WE HAVE a successful medical clinic which, during the past six years, has reduced our sickness from six to four days per person per annum."—Sir Woodman Burbridge, Managing Director, Harrods Ltd., London, England, *Executives Service Bulletin.*

RECENT careful studies cast doubt on the virus theory of colds. In fact, they definitely prove that bacteria in particular B. influenza and pneumocci, are the primary causes of colds."—*California and Western Medicine*, December, 1934.

IT IS a matter of real difficulty for a man brought up in a non-biological school of thought to appreciate the fact that the demand for a clear-cut 'yes' or 'no' answer can meet with no response from a vital science. In the realm of living matter issues are often indefinite, and identical problems do not exist. Often decisions rest on a mere balance of probabilities, and as Sir Alfred Ewing said recently, 'The only dogma is that there is no dogma.' Hence, when the medical man or psychologist attempts to explain his views on the human factor to a man whose training has led by way of mathematics and accountancy or through history and law to an executive position in industry, there may, and indeed often does, arise a state of acute difficulty which, notwithstanding excellent personal relationships and a real desire to help, does effectively place a barrier in the way of active mutual cooperation and understanding."—*The Human Factor.*

LATELY—and it has happened lots of times during the 25 years—elevators seem very slow and telephone connections seem unusually slow. Now that is all to the good, because with these warnings all I need is to take a few days off and 'cool off.' "—Clifford W. Beers, Author of "A Mind That Found Itself."

THE TOLL of labor turnover with its usual cost, the loss of wages, and the group insurance experience have, however, taken their place in the record. The loss of services of an employee injured outside the gates, usually costs an organization (and the employee) more than an accident that occurs within the factory gates."—Roger Williams, Vice-President, Richardson & Boynton Company, *Executives Service Bulletin.*

SEVERAL well-known corporations have abolished their age limit. They have awakened to the fact that the scrapping of their best ability assets is dangerous to business. It is almost equivalent to destroying the power units in their factories. Men of 50 to 60, and in some cases 70, years of age are being employed for what they have accomplished in the past and what they are likely to do in the future."—*American Business.*

EXCLUSIVE of all the other workmen's compensation ills which may or may not be solved by the programs now under way, there is one dark cloud hanging over that field which cannot easily be dispelled. In the occupational disease hazard the casualty companies have hold of something that may explode at any time. No one knows where such claims may lead to unless the coverage is more clearly defined, the exposure limited and the cost adjusted."—*The Spectator.*

IT SEEMS inevitable that mankind should be afflicted with many ills. We have sufferers from brain disorders, sheer meanness of spirit, and socialism. This latter is not the least of the plagues which beset us. Not only the medical profession but also the economic philosophers are engaged in attempting to analyze what causes an apparently normal man to believe that everything is wrong except himself."—*The Bulletin*, Associated Industries of Rhode Island.

IT IS important that the worker should know that death can be and often is caused by electric currents of low tension; that the currents usually act directly in the heart, rather than the nervous system; and that the alternating current is more dangerous to the heart than the continuous current. It is the duty in industry, of those in charge, to see that this knowledge is kept constantly before workers, and it is the duty of the employee to learn the facts which make for safety."—Dr. Claude William Chamberlain.

The Medical Department Manual

—The Complete Handbook of Organization, Operation and Routines Representing Actual Experience and Practice of 20 Years—

by

HART E. FISHER, M.D., F.A.C.S.
Chief Surgeon
Chicago Rapid Transit Co.

SECTIONS Published:
I. History of the Medical Department *(January,* 1934);
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III. Personnel *(February,* 1934).
IV. Functions and Routines;
V. The Centralized Medical Department;
VI. Subjective and Objective Relations;
VII. Research *(March,* 1934).
VIII. Forms *(April,* 1934).
IX. General Instructions to Examining Surgeons;
X. Classifications of Physical Defects;
XI. Classifications for the Reviewing Surgeon *(May,* 1934).
XII. Regulations and Requirements Governing Physical Examinations;
XIII. Interpretation of Physical Defects of Employees for Department Executives *(June,* 1934).

Sections in This Issue:
XIV. Requirements of a Course in Industrial Medicine and Surgery.

Sections in Subsequent Issues:
XV. First Aid.
XVI. Sanitation.
XVII. The Nurse.
XVIII. Industrial Medicine and Surgery; Its Past and Present Status.
XIX. How the Medical Department Can Be a Factor in the Reduction of Absenteeism.

Sec. XIV. Requirements of a Course

REQUIREMENTS of a Course in Industrial Medicine and Surgery for the Undergraduate Medical Student:

The Industrial Physician and Surgeon

THE need of his status, and his limitations. His relation to the employer in industry. His relation to the employees in industry.

His relation to the members of his profession in the community.

His supervision of the medical policy of his company or industry.

The place in which he works, his office, plant hospital and medical department.

The personnel of his office and their duties.

The consultant and specialist staff in industry.

The records to be kept.

The opportunity open to the young doctor in industrial medicine.

Accident Prevention

HISTORY and description of accident prevention in industry. The National Safety Council and its activities in industry.

The industrial surgeon's part in accident prevention.

The mental causes of accidents in industry.

Detection of the potential accident maker by the physician.

Accident prevention in the steel, railroad, chemical and electrical and allied industries.

Industrial Hygiene and Plant Sanitation

VENTILATION, illumination, temperature, humidity and heating in industry. Washing, toilet and drinking water facilities in industry.

Fumes, vapors, gases, and smoke hazards in industry.

Disinfection and fumigation in industry.

Food dispensing and handling in industry.

Personal employee hygiene and clothing protection.

Methods of sanitary inspections and what to look for.

Occupational Diseases

VOCATIONAL hygiene of occupational diseases. Dust as a health hazard and how to prevent it.

Industrial poisonings, occupational intoxications, gases, vapors, fumes.

Mineral and chemical poisonings and their prevention.

Methods of medical inspection and examination to detect these diseases.

Chemical analysis of all compounds, paints, oils to detect harmful ingredients.

Sanitary inspection of all foods and beverages used in industry.

Industrial Medicine, Detection and Cure

STANDARDS of physical examination requirements of employees.

Methods of conducting physical examinations, what to look for, and how to interpret the findings, as to industry.

Examination of applicants for employment before entering the service and a description of defects found in relation to subsequent injuries.

Re-examination of employees at periodical intervals for the detection of disease and conditions which, if undetected, would cause complications at a later date.

Medical inspection of employees absent on account of illness, injury or leave of absence.

Placement of the physically defective employee in the position for which he is best fitted.

Examination of officers and executives.

Examination of female employees and the method of examination.

Industrial surgeon's contact with the employment department.

The relation of the industrial physician and surgeon to rejected employees.

The relation of the industrial physician and surgeon in the treatment of employees, and whom he shall and shall not treat, and why.

Emergency and Urgent Surgery

MINOR injuries in industry and their care. The choice of an anesthetic in traumatic surgery.

Preparation of the patient for operation, and best time to operate.

What cases to operate, and what cases to let alone.

Lacerations, control of bleeding, debridement, toilet, suturing and dressing.

Contusions and abrasions, and the complications to expect, and treatment.

Strains and sprains that may produce disabling after-results.

Punctured wounds, their danger, treatment, and when to use antitetanic.

Rabies as an industrial hazard, and the prevention and treatment.

Burns and scalds, methods of treatment, how to prevent contractures, how and when to skin graft and the method of choice.

Physical therapy in burn cases.

Infections in industry, and their prevention and cure.

Physical therapy of infections.

Tendon injury, suture, repair and physical therapy.

Nerve injury, method of examination, electric detection, method of repair and physical therapy measures for nerve regeneration.

Injuries to the skull, operative and non-operative conditions and treatment.

Foot injuries to employees in industry.

Varicosities as an industrial hazard and their correction.

Spine or back injuries, what to expect from them, method of making a spine examination and method of treatment.

Hernia, the industrial surgeon's most frequent source of embarrassment.

What is an industrial or compensative hernia, which hernia to operate, placement of post-operative hernia cases in the industry, post-operative complications.

Amputations, the necessity of conservation of tissue, artificial limb requirements.

Joint injuries and focal infections of the articular surfaces and treatment.

Fractures and dislocations; those most frequent in industry; when to operate and when not to interfere; methods of fracture reduction and immobilization; how to reduce a fracture; general versus local anesthetic in fracture reduction and operation.

Open reduction of fractures; application of fracture appliances and plaster of paris bandage.

Physical therapy an after reduction measure.

Return of the fracture patient to industry as an economic factor.

Industrial injuries to the chest, their detection and treatment.

Industrial injuries to the abdomen, their diagnosis and treatment.

Industrial Eye Hazards

THE oculist's place in industrial medicine and surgery. Conservation of sight in the industrial worker.

The necessity of competent eye surgeons for eye injuries.

Laymen's efforts at foreign body removal and the complications.

Foreign bodies both in and on the eye, their detection and treatment.

Testing of the eyesight of industrial employees.

The correction of error of refraction in eyes of employees.

The detection of defective color perception and its hazards in industry.

Eye conditions due to industrial conditions.

Prevention of injuries to eyes by protective appliances.

Protection of workers' eyes from the glare of intense light, welding, etc.

The X-Ray in Industry

THE radiographer or roentgenologist in industry. The necessity of frequent x-ray interpretation in traumatic injuries.

The x-ray as a medicolegal necessity in industry.

How to interpret x-ray pictures correctly.

The need of comparison x-ray pictures in bone injuries.

What constitutes an efficient radiographic unit in industry.

Research in Industry

OPPORTUNITY for research in industrial medmedicine and surgery. What there is to learn and channels through which this work can be accomplished. Opportunity afforded for research work in large industrial, medical and surgical departments.

Industrial Dental Service

THE industrial dentist, his duties, equipment and record. Preventive dentistry versus constructive dentistry.

Dental prophylaxis as an aid to the industrial surgeon in injury cases.

Dental surgery in traumatic injuries.

Dental conditions that are factors in occupational diseases.

Dentistry in relation to reduction of sickness in industry.

First Aid (Lay Instruction)

THE necessity of first aid instruction to the laymen in industry. Methods of instruction; organization of the first aid school.

What and what not to teach laymen in first aid to the injured.

Method of organization of a first aid system in industry.

The methods of inspection and reports of first aid stations.

What equipment comprises an efficient first aid outfit.

Contents of the first aid kit.

Locations and designations of first aid stations.

Method of awarding merit to competent first aid and life-saving cases.

How to create competition in first aid work among employees.

First aid work as an aid to the industrial surgeon.

First aid as a factor in accident reduction in industry.

First aid instruction as a health preservation measure.

First Aid in Industrial and Traumatic Injuries

CONTROL of hemorrhage and bandaging. Resuscitation from electric shock, asphyxiation and drowning.

Prevention of electric shock, physiology of electric shock.

Care of fractures and dislocations, and manner of immobilization.

Treatment of lacerations, contusions, bruises, sprains and strains.

Sunstroke and heat prostration in industry.

Treatment of shock following injuries.

Transportation of injured in industry, when and when not to transport.

Medicolegal Industrial Medicine

THE Workmen's Compensation Act. The industrial surgeon in court.

The medical legal expert, his selection and his value.

IN CONCLUSION, I believe it will be seen, from the subjects outlined in this prospectus, that industrial medicine and surgery is not a small undertaking, and that the field of its endeavors is unlimited. The course for the undergraduate should be used as the medium for determining the course to be given to the graduate medical and surgical doctor, and changed to meet his particular requirements. This course of instruction should be supplemented by visits to large industrial plants to view the methods, activities and medical equipment in their medical departments, and attendance by students in clinics and medical departments for close-up instruction, as well as instruction in operative surgery on cadaver and animals as pertaining to industrial or traumatic cases.

Why Worry?

By HAROLD V. GASKILL
Associate Professor of Psychology,
Iowa State College

"WHY WORRY," says your best friend, your physician, your mother, your clergyman —but this cryptic question often fails to comfort you very much. Most of the time it is intended as a comforting remark. When you have something to worry you, you may feel that any advice given, no matter how sincere, just can't be taken seriously, because no one else can actually be in your position and know exactly how you are worrying. Your own troubles and your own worries always seem greater than those of anyone else. And of course they are more *real,* even though they are small, because they are *yours.*

I have often heard one person say to another, "why worry?" Some people say this very lightly. Especially, younger people speaking to older people. Or people very firmly and comfortably established economically and socially tell less fortunate folk not to worry. Or people with very little intelligence say to thoughtful people—"why worry?" I don't like this advice that is lightly thrown out—because the more insincerely it is given, the more insincerely will it be taken. It has been recorded that younger people and a few older folks have said that it was actually abnormal to do any worrying at all. It is certainly *not* abnormal to worry about things which may threaten your safety. If a projected trip is to be made in an unsafe vehicle, worry probably will prevent an intelligent person from making the trip that way. He will go some other way, and there will be no bad results. We can surely have a very normal anxiety about something which threatens our plans. Nothing abnormal about that. If a man is so lacking in intelligence and in the ability to analyze possible results that he may see his plans heading for a smash-up without any worry, it is a good bet that those plans really aren't worth any anxiety. Human beings are the intelligent beings they are because they can make plans and they can see ahead. They can anticipate certain dangers and pitfalls, and then these dangers can be avoided. Unforseen dangers cause disaster when they actually arrive. They aren't anticipated and worried about, and of course plans for them were not made. Dangers we see ahead and plan for can be avoided. And life goes on smoothly. A little worry and a little anxiety made the dangers and pitfalls avoidable—and a little anxiety is much more pleasant than a disaster. Civilization has progressed as it has, partly because man has been capable of worry and anxiety.

This may seem to be an approval of all worrying, and even an encouragement for more of it. Far from it! I certainly don't want you to draw that conclusion. I have attempted to be explicit about anxiety to counteract any of the inane and baseless "Pollyana psychology" which you may have heard of. It is very well to tell someone not to worry, and then just let it go at that. It is very well to be a flightly "glad girl" and prevent anxiety only to have disaster follow. But it is pretty hard on the person who received this kind of advice. That is the thing I want to expose; and to prevent its acceptance by you. But again I must say that I don't want all of this mention of disaster to sound like the "big bad wolf" jumping right through the door. We want, rather, to avoid any insecure foundation for preventing worry or anxiety and to put in its place a firm, intelligent basis for 'no worry' so that when the problem is viewed with a cool and unemotional scrutiny, your procedure will stand up and pass the test of endurance. It must be rational and intelligent to last. We tell the little boy in the bright light of day not to worry about the dark of night, and boastfully and emotionally reassure him, and he doesn't worry, until night arrives again! We want the reasons for not worrying to work just as well at night as they do at noon.

If we look unemotionally at the problem of worry, some facts become very clear. Frist, the old oft-repeated expression "worry doesn't prevent trouble," takes on a new meaning. Worry may show how trouble can be avoided, and in that sense it may be an aid to planning. But, it takes on new meaning when we distinguish between anxiety about carefully laid plans, and worry which is wasteful because it is directed toward an unchangeable occurrence or event. For example, it would be very, very wasteful to worry about the size of the ocean if you had to make a trip across the ocean. No amount of anxiety or worry can change the size of the ocean. Worrying about crossing the ocean in a washtub or on horseback might be useful if it caused you to choose as your

means of transportation a modern ocean liner, but it would be useless in changing the distance between New York and Liverpool. My illustration may sound crude and absurd, yet much present day worrying is just as absurd. A person may worry and worry about an investment, yet never *do* anything about it. Instead of getting reliable information, or finding business records and objective facts about his investment, he spends all of his time worrying. So that this worrying is wholly a waste of time. Aside from the unpleasantness and unhappiness which worry brings, it is an inefficient use of human time and human energy. The greatest argument against that type of worry is that much valuable time and energy are wasted, bringing absolutely no return. If much of one's daily life is spent that way, not a lot of time is left over for constructive work, or for doing more pleasant things. And time keeps slipping along. If you look back over last week's work and find you have left a lot undone, how much more work could you have done if you hadn't worried about doing it? And how much time are you losing now, worrying about work that wasn't done? How much of that work could you actually do in the time you take to worry about it? I have seen college students develop a habit of worrying in just that way. A big husky boy gets up from a good dinner and then starts to worry about getting his lessons. And he even gets some of his friends to help him worry. Jim says, "Yes, Professor So and So is a hard professor, and mathematics is a hard subject, and it will be bad for all of us if we don't have our lessons for tomorrow . . ." and they spend an hour in cooperative worrying—an hour totally wasted because it does no one any good. That is merely a common sense view of that type of worry. Always apply that reasoning before you launch out on any serious worrying. It may prove wasteful under that kind of inspection.

Then, too, there is the old saying, "Don't cry over spilled milk." The person who invented that was quite a conscience salver. But, just as Pollyana's gladness is effervescent, this conscience salving doesn't last. It won't stand up under the strong light of day. And for many types of "spilled milk" it really shouldn't work. If something done in the past has led to error, we should be intelligent enough to prevent that in the future. Anxiety over bad investments in the past won't return your money, but it should prevent further pouring of money into rat holes. Worrying over an automobile accident which was caused by faulty brakes won't help unless it causes us to have our brakes relined. Then it has done some good. But just there is the important point of distinction. We must recognize clearly the value of that type of anxiety. If we spend time worrying over spilled milk because we want that milk, quite obviously that is not intelligent human behavior. But if that prevents us from spilling any more milk in that way—it has done us some good.

Now, a word about trivial and insignificant worries. These are really the worst of all. They are the kind that are surely not a part of any intelligent behavior. But the person who worries over trivial things is not to be laughed at or scoffed at —he is to be pitied, and above all, to be helped. If he can be made to see his trivial worries under a different light, from a different viewpoint, he is bound to be helped. But please remember that when you are trying to help him, *you* have that different viewpoint, and he doesn't. Something in his make-up gives him his viewpoint, and it is only ignorant and cruel to laugh at his viewpoint. You must *change* his viewpoint — remove the thing that makes his anxiety possible. Only laughing at it, or scoffing at it, or applying Pollyanna tactics is like treating the symptoms of a disease rather than the disease itself. Intelligent sympathy and kindness in trying to understand these trivial worries is the real way to cure them. No amount of blustering, swearing or laughing helps.

The "sense of inferiority" we hear so much about—which was experienced by mankind long before the word was coined—is often a result of worry. Worrying about things people say, which to an oversensitive person seems to be pretty severe, can be overcome when one realizes that one is oversensitive. Some people are too hasty about criticizing others, and that causes worry, especially when the person criticized takes the criticism too seriously. If all of us were more tolerant, and less ready to criticize behavior and customs and clothing, the source of this kind of anxiety would be removed. But when the person worrying realizes that many criticisms are insincere, and criticism of customs and clothing is often a result of ignorance or intolerance—there is really no cause for or no reason for worry. Touchiness and oversensitiveness, then, predispose to worry; if we didn't have those characteristics we would be incapable of anxiety over criticism. Therefore, an intelligent thing to do is to try sincerely to avoid being touchy and sensitive. I like the way many present day college students seem to develop a callousness for criticism. If it doesn't do any immediate good, at least it prevents an oversensitiveness to criticism in later life.

Fear of putting ones self to a test causes avoidable worry. We are prone to underestimate our ability to do things, before they have been done. We worry about a supposed inability to "act right" in a social situation, a supposed inability to carry on enterprises such as selling and executive work, when actually we could do those things comparatively well, and with a high degree of success. We just have anxiety over the outcome. A very intelligent woman told me the other day that she had to give a report at a woman's club in the near future, and she was terribly worried because she was sure that she couldn't do it well. A short discussion of the members of her club showed her that they were all women just like her—all good substantial housewives. No austere and prepossessing women belonged to her club—no one would expect professional perfection — even though that actually exists, a point about which many are doubtful. We even selected a national radio program featuring one of the outstanding women of our country today—and I asked this over-anxious lady to jot down the hesitancies of speech, the number of "and a's," and other similar mistakes which we all make at one time or another. She became quite confident, and decided she could do just about as well, and her speech wasn't to be broadcast from coast to coast either. In place of worrying about putting herself to the test, she began to concentrate on the preparation of a good report, and actually performed very well.

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"Is There a Doctor in the House?"

EVERYONE recognizes this question. And, seeing it in print, nearly everyone can recall the time and circumstances when it focused the attention of an audience. Memory will usually go that far.

Let us, however, go farther. The time and circumstances at any moment when this question is asked are public matters. People are gathered together on the basis of a common interest in the purpose of their assembly, be it concert, theatre, prize fight, movie, lecture, or what not. Suddenly somebody faints or is hurt, succumbs to a subjective or objective condition, with results that are obviously not within any purpose of the gathering but only within the province of the doctor. The question goes out and, if there is—and rarely is there not—a doctor in the house, it is answered instantly. The doctor comes forward and takes charge, the gathering goes back to its purpose, and soon the incident is forgotten.

But these significances remain:

During the fraction of a second between the asking of the question and its mental absorption as an emergency call, the reason for the question was a matter of immediate public concern;

Every one in the place was interested because any one in the place might have been the subject of the emergency;

There was unanimous expectation that a doctor would be present, and unanimous conviction that he would announce himself and come forward;

When he did appear he was instantly, if tacitly, recognized as the duly qualified representative of the public in all respects of the emergency;

When he took charge—which he did without argument or hesitation—the responsibility became *his* and was left to *him;* and

The incident then, as quickly as it had become a public matter, ceased to be a public matter, and became purely a matter of personal relation between the subject and the doctor.

And neither the audience nor any part of it stood by to tell the doctor what to do, or how to do it, or how much he would be paid when it was done.

NOW imagine the lay proponents of all the 150 or more plans for medical services being presently agitated gathered together in Madison Square Garden. Suddenly one of them throws a fit, and the call goes up for "a doctor." A doctor comes forward and takes charge.

What might happen? Logically the doctor might expect the whole assembly to help him—each individual telling him what to do, how to do it, and how much to expect for his services—according to his favorite plan. Or, equally logically, the doctor might expect his directions to come from joint action: "Be it resolved that the patient be given . . . . at a cost of $ . . . ."

But no! The doctor and the subject would be left as usual in their inevitable personal relation—the personal relation which took the place of the group interest at the moment the doctor took charge of the case.

But *why*—since the group is a "medical-plan" assembly?

Is there a better answer than this:

Neither the lay group nor any of its component members would be willing to assume the medical or surgical or any other responsibility involved in the emergency. The situation would be tangible and individual, and, to the exclusion of everything else for the time being, would demand the personal relation between doctor and patient which is the *sine quo non* of the medical profession.

In every such instance this relation begins at the instant the doctor starts forward. He embodies the relation, his very presence implies it, his status as a doctor concentrates the public interest in the emergency upon him as carrying with him his half of the relation necessary to meet the emergency.

And so, when this question is asked, nobody but the doctor can answer it; and, since of necessity everyone relies upon the doctor when such situations become tangible and individual, the layman will not presume to tell the doctor about the medicine or surgery of a particular case.

BUT let the matter be abstract, let the consideration of cases, emergency or otherwise, be *en masse* so that there is no particular or specified individual relation within the conscious horizon—then the layman assumes all kinds of things.

Right now the layman is assuming too much.

We need not review here the extent of his assumptions—newspapers and magazines are full of his plans to regulate and control the practice of medicine, propaganda agencies and lobbyists are busy urging their adoption. And with the President outspoken on a plan of one kind or another to go before Congress, the medical profession is up in arms and, for the first time since the depression began, is viewing the whole situation as having a very imminent, a very dangerous, and a very practical significance.

Some of the expressions of opinion embodied in medical society resolutions, medical magazine

editorials, committee reports and individual views are perfect gems of resentment; they say all there is to say on the doctors' side of the matter logically, authoritatively and convincingly; they make out a very good case for—unfortunately—the defendant.

But even so they are in grave danger of failing to accomplish their purpose.

And that is just the point of this discussion.

It will do no good for the doctors to tell each other what they think about the lay efforts toward health insurance, the lay efforts toward laws that will impose state medicine in this country in the face of the fact that it is a failure wherever else it has been tried. Too many of the fulminations against the danger are likely to eventuate as mere communications from one doctor to another.

THE DOCTORS must do more than tell each other about it. The public gathering so psychologically analyzed above is only a prototype of the situation as a whole. And at the present moment the agitation is doubly a matter of immediate public interest; nobody has asked the question, "Is there a doctor in the house," but the time is at hand for the doctor to come forward *because he is the subject alike of the meeting and the emergency.* Indeed, there is an air of something about to happen, because, whether the laymen are conscious of it or not, they are expecting the doctor to come forward; they really don't want the responsibility except as they can make it a matter of law.

The doctor must come forward.

He must tell the laymen what it is that he, the doctor, wants and must have; that lay plans are not right, and why they are not right. And he, the doctor, must put off for a while a little of his aloofness and get busy with methods and measures that laymen understand, even the same kinds of methods and measures that the laymen are using.

The matter needs the doctor's *personal* attention; and, from the same reactions that follow in the smaller situation, *if he gives it his personal attention,* he will soon be in charge of the case in the larger situation—for the group interest everytime will yield to the personal relation if; as, when, and to the extent that the doctor himself commands.

A lot of the self-starting, crusade-inspired groups, philanthropical organizations, social workers, etc., are getting away with it because the situation as they see it is only abstract, because as a matter of cold fact, there *isn't* "a doctor in the house." There is nobody among them or before them to crystallize the matter, to make it individual, specific, concrete, personal. The doctor is the one, and the only one, who can make it that. But he is somewhere else, telling his fellow doctors what he thinks of things.

TO THE extent that the subject matter of all or any of the proposed plans can be made individual, specific, concrete and personal, the problems involved will be much more likely to yield to sensible solution, without the necessity of the unsatisfactory experimentations toward which the country seems to be headed—experimentations that will learn no lessons from failures elsewhere, but will be abandoned here only after a terrific price, in coin of the very things they seek to alleviate, shall have been paid.

But how to make this subject matter individual, specific, personal . . . ?

An editorial in *J.A.M.A.* (February 23, 1935), following the special session of the American Medical Association House of Delegates on February 15 and 16 to consider policies of sickness care, ends with these words: "Physicians who wish to preserve to the medical profession the right to say how medicine shall be practiced, their initiative in diagnosis, treatment and investigation of disease, and the intimate personal relationship that must exist between doctor and patient for the best results, will place behind these policies all the individual support they are able to muster."

But that isn't going to be enough. The physician must *lead* the muster *"himself personally."*

The situation demands *his* presence; no man can submit to an operation by proxy nor be cured of a disease by having his agent or attorney-in-fact take the treatments. The physician, and no one else, must be the head and front of the "individual support." And if the physician *leads,* the support will follow.

THEREFORE, in order that the physicians of the United States may preserve the standards of their profession and avert the lay-inspired chaos that threatens:

In every lay gathering to discuss health insurance—

In every lay assembly to talk about state medicine, or its related "panaceas," systems or plans—

At every legislative committee meeting to consider the proposed bills—

In every council where the subject is part of the order of business, and—

At all sessions of law-makers, from those of the Congress at Washington to those of the county boards and municipal councils at home—

Let there be "a doctor in the house"?

If he isn't invited, let him go anyhow—"crash" the gate if necessary—because he has the right to be heard. He *can* get in if he *wants* to get in. And he ought to want to get in, because *he is the duly qualified representative of the public in medical matters*—needless to say much more qualified and much more representative than the laymen who are leading the present agitation.

THIS may not appeal to some doctors. But neither will the disposal of their time, the dictation of laymen, the regulation of their charges, the tearing down of their professional status by the erosion of unnecessary laws appeal to them. If it is a choice between two evils, the lesser one by far is the relinquishment of some part of the traditional aloofness that is now being invoked as a criticism of the medical profession in general, and the taking on of some of the openly aggressive characteristics—mixing, assertiveness, or, if you please, salesmanship—in terms the layman will understand and respond to, in terms that will make him perceive and respect the inevitable and necessary personal relation, in terms that will make him view the whole matter as, after all, a matter of this personal relation.

The doctors *can* do this. And they can do it without any breach of ethics or letting down of dignity.

Their organizations *can*, if they will, place a key man at every strategic point in the country, so effectively that, from now on whenever and wherever people meet to propose, or dispose, or legislate concerning the medical profession there will be "a doctor in the house"

—as there must be, lest there come upon the doctor the years of which he shall say: "I have no pleasure in them . . ."

No doctor is too far removed from the effects of the general economic situation to remain aloof; none is so highly specialized as to be beyond the damage if the threats of the present danger become the actuality of the danger itself. Neither the general practitioner, the specialist in any line, the medical consultant, the medical scientist nor the medical professor can refuse or neglect to become actively and personally interested *now*—least of all the doctor whose practice takes him into industrial medicine.

Health Maintenance vs. Body Repair

PUBLIC hygiene — preventive medicine applied to aggregate health as a matter of public welfare — is in strong hands and under competent direction. Pure water, pure food, pure air, and the control and prevention of epidemic diseases are problems of public interest somewhere at any time and subjects of governmental activity everywhere all the time.

But personal hygiene—preventive medicine applied to individual health as a matter of personal welfare—is not so fortunately situated. In a sense it is everybody's business and hence is nobody's business—excepting, of course, that it is the very profitable business of the vendors of nostrums—who seem to have almost convinced the people comprising "the public" that personal hygiene is exclusively a matter of getting rid of the wrinkles, pimples, dandruff, ringworms, odors, etc., that make them the unlovely and smelly lot the advertisements pretty plainly tell them they are.

THE physician, so indispensable in public health, has been excluded from the personal side of the hygiene problem largely because of the persistence of the idea that if a person is not sick he is well.

In industry, where the employed person is being paid on the inevitable basis of work for wages and wages for work, the term "sick" has a definite meaning. Being "sick" is practically altogether a matter of being absent from work; if the employee is present at his job he is not "sick," and, therefore, he is "well"—because, in general, pay day recognizes no middle ground.

But there *is* a middle ground, as Drs. Emerson and Cragin pointed out in their able and interesting article, "Health Diagnosis in Adults," in the January, 1935, issue of *Industrial Medicine*.

This article presents the results of work done on a new basis, that of health diagnosis, which has timely and practical importance in industry. The subject matter of the article having been brought to their attention, several large industrial companies are already considering the adoption of Dr. Emerson's program in addition to their regular medical program, which, in Dr. Emerson's words, "is largely repair work."

THE practical importance of health diagnosis in industry is inextricably involved with the trend of the times.

It is now apparent to industrial physicians as never before that in respect of an employee's ability to earn his pay there is no line of sharp cleavage between "sick" and "well." The definiteness as to which is which that will satisfy the paymaster, has no counterpart in the medical department. For the in-between, the middle ground, lies in the fact that an employee may be neither "sick" nor "well" by being simply unfit.

This is particularly important in the brackets where the pay is in terms of salary instead of wages—in the executive class. Its importance is more than doubled when the unfitness is habitual. It is evident that the success of any organization depends upon the efficiency of the executive—the key man—and here is a vital point as stated by Dr. Emerson, namely, that when health is impaired the higher powers — judgment, initiative, vigor and personality—are first affected.

To safeguard these qualities means efficiency in its most significant aspect. It also means the safeguarding of the payroll, for it is for these higher qualities that the higher salaries are paid.

Often enough—in words that are plain—the acts and decisions of the executive as affected by his irascibility on Monday are tolerable to his rather intelligent staff only because they have come to recognize in him, on Mondays, their duly "constipated boss."

BUT it is in the lower brackets—where wages are wages and (under the A.F.L. interpretation of Section 7a) a man is a union card—that this health diagnosis can have perhaps its greatest industrial significance. For in these brackets it isn't the employee who is "sick" who is the accident risk or the occupational disease risk. It is the employee who is not "sick," but, in so far as the payroll is concerned, is "well," and at work, who is the risk.

The "sick" man is safe at home, or in the hospital. As an accident or disease risk he is, for the time being, at a minimum, or at least on a definite basis. He is, however, getting the maximum of medical attention.

But the "well" man, "well" because he is not "sick," is at work. As an accident or disease risk he is, for the time being, at a maximum, and certainly on an indefinite, basis; and he is getting not the minimum of medical attention, but, except for possible periodic medical examinations, no medical attention at all.

Now the "well" man, at work, may be fit or unfit. If he is fit, he may not stay that way—probably will not, because fitness requires the kind of constant positive effort that is so much more difficult to make habitual than the no-effort insidiousness of doing nothing about it.

It is the "well" man, at work, therefore, who gets too fat, or too thin, "catches cold," has high blood pressure, is distracted by toothache, doesn't feel "up to par" . . . becomes susceptible to disease.

It is the "well" man, at work, who develops accident-proneness, a neurosis, emotional upsets, a little befuddlement as to brain, a little unsteadiness of hand, a little carelessness in general . . . has an accident.

That the well man, however, both executive

and employee, will cooperate in maintaining an increasing efficiency, by correcting physical defects and faulty health habits, is shown by the fact that the majority of the staff and employees of the Aetna Company not only availed themselves of this Physical Fitness Service but also made an average of 5½ return visits in their efforts to attain better health.

THERE has been a tendency both in industry and outside of it to treat medical service to employees as just "medical service"—something due the employees from, possibly, an altruistic point of view—something given them with, apparent somewhere in the the background, the self-satisfaction of a philanthropic duty well performed. In the face of the now far-reaching scope of workmen's compensation it is remarkable how persistent that tendency still is. But maybe the industrial executives who like to think of their company medical activities as evidences of heart-warming generosity are more or less whistling to keep up their courage, as they contemplate the increasing costs of accidents and sickness under the judicial amplifications of laws and more laws that are making them compensable. And, no doubt, they will not openly admit the economic significance of employee medical service in their ability to show profits from their business operations until long after they have given it a prominent place among the items of profitable expenditures on their books of account.

But, be that as it may, accidents and sicknesses among employees cost the employer money. That is the fact, and it remains the fact no matter how thickly overlaid with human-suffering and humane-treatment platitudes. As to how much they cost, the insurance companies know, if the industries don't; it will not be long, however, before premium rates become fully informative. And the amount they cost is going up, instead of down, if for no other reason than because occupational diseases are becoming increasingly compensable.

This cost is, and will continue to be, imposed from outside of industry. The defense against it must be developed inside of industry.

IT IS interesting to consider how industry, harrassed from within by labor and from without by law, can set up its own defenses and establish its own reprisals. Already it is doing something about silicosis; in addition to preventive measures speedily adopted, the plaintiffs in the innumerable racketeering silicosis suits at law are not going to be warmly invited back to the payroll. The new (always new in a depression) social psychology may establish the right of every person to a job, but it can never establish his right to go to work in any particular job. Only the employer can do that; his alone is the right of selection. A certain degree of selection is now the rule where pre-employment medical examinations are required. The trend is toward more. Unemployment insurance, which keeps an employee as a payroll liability after he ceases work, is certain to make it necessary for him to respond to higher tests before he is put to work.

But let us go to the ultimate which industry can do, and possibly at no distant date may find it necessary to do.

Picture the morning roll call of the medically-selected and medically-supervised group who will be the employees, answered not by "Present" or "Absent," but instead by "Fit" or "Unfit"—with the physician at hand to determine whether the answer in either case is the truth. "Unfit" then will be a serious matter. The sound sense in this picture is the argument that if it is a duty of the employer to furnish his employee a safe place in which to work, it is equally the duty of the employee to bring to the work in that safe place a safe body with which to do it. And an "unfit" body isn't safe.

Moreover, in contacts with customers an "unfit" body is not the kind either to create or maintain public goodwill.

SO MANY men who have pioneered along unusual lines have ben considered ahead of their times. It is to be hoped that Dr. Emerson will not be so considered. He is firmly established as an authority on his subject*; to physicians in general he has proved the need of physicians in the field of health as well as in the field of disease, and has demonstrated by his studies of the extent of physical unfitness that the field of health has unlimited opportunities. And from the industrial side he has started something of incalculable value, not only from the executive standpoint, but also opening up a wider and more economically important, if less spectacular, expression of the use and value of the medical department in industry.

His work has a very potent *present* significance; this is apparent when it is remembered that so very many medical programs in industry are, as yet, as he so pertinently remarks, "largely repair work."

Preparing for the New

DR. SAPPINGTON refers to silicosis as a "top problem" (p. 67) so important that "no less a person than the chief officer or president of any corporation should take the responsibility for the proper handling of it." Executive interest in silicosis is now very marked; the subject became an industrial issue rather suddenly, and an executive issue very expensively. The obvious sequence is for the executive to consult the doctor and the doctor to consult the literature. Possibly Dr. Daniel N. Barber (p. 92) became interested in that way. At any rate his article (reprinted here from *West Virginia Medical Journal)* was called to our attention by an executive, who recommends it to other executives. The following paragraph, however, might have been aimed directly at the industrial physician:

"After reading a good many pages by a considerable number of authors, I feel that we are at present in a rather vague state regarding silicosis. A few years ago it had all been worked out in a one-two-three manner—quite understandable, but recently the authorities have taken to disagreeing over many phases of the subject and seem to be actively engaged in further studies and researches with the view of rewriting the whole subject. Perhaps we will better understand the new, however, if we are more familiar with the work up to this date."

J.A.M.A. Editorial May 27, 1933.
Emerson, William R. P.: Physical Unfitness in the Preparatory School, *Am. J. Dis. Child.* 44:509 (Sept.) 1932. The College and Physical Fitness, *Dartmouth Alumni Mag.* 23:7 (March) 1931. The Diagnosis of Health, New York, D. Appleton & Co., 1930.

Workmen's Compensation

Massachusetts

THERE has been a constant and tremendous increase in compensation insurance premiums which, in our opinion, may be traced to legislative action in gradually amending the workmen's law by granting more liberal benefits. We are satisfied that this liberalization in the supposed interest of the employee has, as a matter of fact, by throwing an increasingly greater burden on industry, really been a detriment to employees in general." — Special Commission on Old Age Discrimination and Old Age Assistance, Minority Report.

Ohio

THE final report of the special committee to investigate workmen's compensation law, a state fund system, was filed with Governor White in January. Representing nearly a year's work, the report attributes much of the trouble and dissatisfaction that has arisen with the administration of the law to politics, lack of business methods and dishonesty. "Because of political influence, lack of constructive and intelligent development and business-like methods, until very recently and in some instances dishonest personnel, the administration of the law has not been efficiently managed and directed, and certain of its methods and procedure can only be characterized as loose, irregular and unsuitable," the committee declared among its 19 specific criticisms.

The first criticism was directed against the administrative code enacted in 1921, which placed the industrial commission under the control of the director of industrial relations. The last legislature, on a preliminary report of the committee, separated the two departments to make the industrial commission independent.

The finger of criticism is placed on the medical examination work, on the method of punishing dishonest employers, on the delinquency of the various state departments, on the actuarial conditions, and on the failure to provide adequate money with which to maintain the commissioner's work.

New York

TWO years ago, the Governor, recognizing the weaknesses and injustices in the Workmen's Compensation Law, appointed a committee of 10, five from the Academy and five from the State Society, to study the problem and recommend appropriate legislation. A review of the origin, life history, and obsequies of the report of this Committee will be enlightening as an illustration of the difficulties and obstacles which are encountered in attempting legislative correction of defects or maladjustments in existing laws.

"The committee innocently labored to present a satisfactory solution, with no recompense, with no appropriation. It was recognized that the law was conceived in the interests of the injured worker; that it is he who was and must be the major consideration; that the medical profession plays an important part but necessarily secondary. The recommendations were drafted with these as the basic conceptions. It was recommended that limited free choice be allowed, that the professional ability and integrity of those caring for the injured be assured, that exploitation, racketeering and advertising be eliminated, that organized medicine be responsible for the character of the work and the personnel. The technic of organization with every possible safeguard was carefully framed. The officials of the Compensation Bureau were, or seemed to be, won over. But self insurers and carriers, with whom we met repeatedly, opposed uncompromisingly throughout. They represented the railroads, industries, traffic, public utilities and insurance companies. They all lined up against it and presented a united opposition. They objected particularly to any semblance of free choice, which we regarded as an inalienable right of the injured and a basic principle in the relation between doctor and patient. Then every cult, including Christian Science, wanted representation and equal rights. After 10 months' of study, the report was presented to the Governor who expressed satisfaction and referred it to the legislature with recommendations for its adoption. A bill was drafted. Just before the legislature adjourned, the committee, with the proponents and opponents of the bill, was called to a hearing before the Senate Committee. Many attended at considerable trouble and expense. One Senator was present. Scant attention was shown during the presentation of pleas for the bill, and interest awakened only when labor with Irish wit made an impassioned address, to the surprise of everyone, for the bill. So we lined up, medicine, allied with labor at the eleventh hour, against the representatives of the carriers and self insurers, some 15 to 20 in number. They said little but one felt the influence of the companies which they represented. The bill was not taken out of committee. Our case was lost . . . Although the bill was killed last year it has not been allowed to remain dead; its resurrection is imminent. A Workmen's Compensation Act on the lines suggested by the Medical Committee will be presented again." — Eugene H. Pool (Address of Incoming President, New York Academy of Medicine, Annual Meeting, January 3, 1935).

THE importance to the employee of securing such independent aid is evidenced by the fact that in a large proportion of cases the state examiner finds disability after the carrier's physician has ordered an injured employee to resume his regular work and has advised the stoppage of compensation benefits. A few years ago the State Department of Labor conducted an unannounced examination of all injured employees who appeared at the information room and complained that the employers or carriers refused to give them further treatment. The medical examination conducted by the assistant to the chief medical examiner of the state, showed that further treatment was necessary in over 50% of the cases. The facts thus show that under the present procedure physicians have too frequently been used not to render adequate treatment, but to cut down the costs to the employer by underestimating periods of disability and rendering biased medical testimony on the questions of causal relationship and the extent of disability. This situation has led to such suspicion and hostility by injured employees that the essential relationship between physician and patient has been seriously undermined if not entirely lost in compensation practice. The insurance companies have justified their insistence on controlling the choice of physicians on the ground that it is only through such control that they can keep down medical costs. But the facts do not support this claim. Medical control by insurance companies has been used to limit the benefits paid to injured workers rather than to keep down medical costs."—Justine Wise Tulin, Asst. Corp. Counsel, City of New York, in **Bulletin of New York Academy of Medicine**, January, 1935.

Voice of Labor

R. GRONEMAN, Correspondent, Painters' District Council No. 14, in Federation News (December 29, 1934):—You have heard the reading of the credential from Painters' District Council No. 14, which authorizes Brother John Runnberg and myself, in representing our Central Organization, to visit and discuss with you the real value of Section 2 of the "Occupational Disease Law" of the state of Illinois.

First I must admit, that I do not know just how many trades or vocations are represented by those present here. I wish to emphasize the fact that this attempt on the part of Painters' District Council No. 14 to request your cooperation is not for a selfish purpose, such as trying to obtain certain advantages for the members of the local unions, affiliated with the central body of the Painters and Decorators, but we are trying to get **all** of **those** interested, who are engaged in between 300 to 350 industries, from which an occupational disease may arise at any time. It is really a matter for astonishment that the protection of health, which is a fundamental duty of the state, should not have been better understood by the responsible authorities, the more so since it is obvious that injuries due to occupational diseases are of more important from the aspect of the individual and of society than those caused by accidents.

In fact, disease in most cases attacks the whole system and, in the case of poisoning, the most important organs of the body. It brings about serious and deep-seated destruction of health and often exerts an effect on progeny and the race, and in general on resistance to the action of infectious or morbid agents. The The workers in practically all voca-

tions are more or less exposed to certain noxious conditions; the consequences are various disturbances in the integrity of their bodies and their ability to work.

When affected by disease with a loss of health and the ability to work it seems immaterial to find out how and why the trouble developed, for in both cases the damage to the health of the worker has been brought on by his or her activity in a particular trade or vocation. **However,** from the standpoint of being entitled to compensation, we find a difference in the exact definition of the words—injury through an accident, or injury caused by an occupational disease. This leads to the discussion of what is an industrial accident that causes poisoning, and what is an occupational disease that has the same effect?

Here is one version of it: An occupational disease arises gradually from the character of the work in which the employee is engaged. It does not occur suddenly, but it is a matter of slow development and it is not traceable to a definite time. Now, what all of us should be greatly interested in is the fact that the Supreme Court of Illinois held that an occupational disease is not an "injury" nor an "accidental injury." Peru Plow vs. Industrial Commission, 311 Ill. 220; Matthiessen & Hegeler Zinc Co. vs. Industrial Board, 284 Ill. 378.) According to this decision the "injury" or "accidental injury" is distinguished from an occupational disease when it arises **suddenly** in some definite event which can be fixed with certainty. An occupational disease cannot be so fixed. It is of slow development and it is caused by the cumulative effect of successive injuries. This is what those **decisions** are based on. Now, let us consider what that really means: While it is true that in the case of an occupational disease, inception is usually slow, insidious and difficult to determine and in the case of an accident, its occurrence in point of time can be **accurately** determined, it is also true, that the laws of certain other states and a number of other nations are much more liberal in the definition of what should be classed as an accident and what as an occupational disease. **This** fact we should bear constantly in mind, that we must try to do our level best to obtain the most liberal interpretation of the present compensation act of Illinois.

Not every disease brought on while working at a trade is an **occupational** disease. For instance: a cold caused by draft while working in the office, or rheumatism from dampness in the work-room, or lead poisoning from drinking water out of lead pipes, carbon monoxide poisoning in garages, or from illuminating gas in living rooms, etc. These diseases are not compensable. Only when a disease occurs quite regularly among the members of any certain vocational group or considerably more frequently than among the rest of the population—only then may it be pronounced an occupational disease. However, this definition in its broadest sense does not mean that the sickness has been caused by the vocation only, but it also covers any sickness or disease found quite often and predominating in any particular trade.

Besides the accumulation of certain diseases, we find real damages caused exclusively by the actual work, such as an over distention of the cheeks of the glass blower, or working in caissons, water-tight chambers, which work will sometimes bring on paralysis of the limbs and other damages caused by carelessness in regulating the high air-pressure in the chamber, catatract of the eye caused by looking at molten glass or iron in the blast-furnaces of the foundries, deafness caused by excessive noise, while working, for instance, in a boiler-factory or with pneumatic tools, when some of them have a speed of as high as 6,000 blows per minute with a terrific noise, or burns caused by the x-ray and other rays, when contracted by the operator, or exposure to radium when working for a living painting luminous watch dials. Many girls using this radium-paint have been seriously affected without any known remedy for their condition, and there are many other cases of such actual damage.

A very **important** question to consider is which injuries should be listed as occupational diseases and which are considered accidents, as we understand the exact meaning of the word. Let us consider how that would work out with certain **infectious** diseases contracted while working at certain trades. According to the decision of the Illinois Supreme Court, an occupational disease does not occur suddenly, it is a matter of slow development and it is not traceable to a definite time. Now, it **would** be possible to trace a definite time, for instance, in all cases where from the handling of hides, and hair of cattle, hogs, horses and the wool of sheep, etc.—butchers, tanners, woolsorters and brush-makers become infected through skin abrasions and through their lungs with woolsorters disease (anthrax), brought on by spores, which are small invisible reproductive bodies, that cause an almost instant infection—or the spores of lock-jaw (tetanus) found around stable refuse, garden earth, street dirt and in filthy rags, which will enter lacerated or punctured wounds of the hands and feet from splinters or nails—even in a less acute development such as glanders, lumpy-jaw and foot and mouth disease, it would suffiice to prove that the harmful agents have acted on the body in such an intense fashion that their action may be described as having occurred within a fairly restricted time-limit. Opinion has been expressed that acute infectious diseases should be regarded as an accident, though certain legislative authorities have preferred to inscribe such diseases in the list of occupational diseases, which they certainly are.

I brought this out to show what a loop-hole there is left for the legal profession to deprive a victim of a just compensation.

There is another matter of great importance: One of the tasks imposed on the medical profession by social legislation is the compulsory notification of occupational diseases. We have a law to that effect in this state now. It is but logical, that rational and effective organization of preventive and protective medicine can only be based on exact knowledge of occupational risk. Notification should also be required in regards to suspected cases. Factory surgeons or medical men entrusted with the periodical examination of the workers are and should not be exempt from this obligation.

The attending physician should be entitled to a reasonable fee for the prompt compliance with this law; however, any unreasonable delay or neglect on his part should be made punishable by the payment of a fine of from $5 to $250, according to the importance of the circumstances involved. The special knowledge required in regard to occupational diseases, the long experience necessary in regard to detection and diagnosis, not to speak of the special treatment required, and above all, the necessity for expert opinion in assessing injury, can only be obtained by engaging a specially trained medical man. Most important is the medical certificate—the basis of all compensation procedure—provided by the medical man who was the first to examine the victim of the accident or the occupational disease.

Now, consider Section 2 of the "Occupational Disease Act" of the State of Illinois. The law, as it reads at present, establishes three general classifications of industries under Section 2. They are:

1. Those who are engaged in an industry using six specially named compounds of lead or paris green.
2. Those who are engaged in the manufacture of brass or the smelting of lead or zinc, and
3. Every employer in this state engaged in any process of manufacture or labor in which poisonous chemicals, minerals or other substances are used or handled by the employees therein in harmful quantities or under harmful conditions.

I might mention that only 10 of the different states have enactments extending coverage to occupational diseases. In Illinois the selected number of groups is but three; in New York it is 27; in Ohio it is 21, etc. Perhaps many of you are not aware of the fact that ever since June 21, 1923, for 11 long years one "comma" and the word "or" had been left out in the wording of the third classification of the present law. This omission of the word "or" caused 31 words in that act to become meaningless. Many cases in the lower courts were thrown out; they held that they had no authority to change the wording and intent of that act by adding something to it. Only recently the Supreme Court of the State of Illinois ordered the word "or" inserted to restore the original intent of the law. (Burns vs. Industrial Commission, 356 Ill. 602.) It now remains to be seen just how many definitions of the word "or" the legal profession will be able to produce, so as to confuse the issue. The law as it reads with the word "or" included, means a great advantage and therefore let us make the most of it.

It may interest you to hear that three authorities agreed and told us that by inserting the word 'or" Section 2 of the Compensation Act would then apply to and cover all occupational diseases.

These three authorities are: Professor Carmel of Northwestern University, Dr. Beach of the State Department of Public Health, and Vic-

tor Olander, Secretary of the Illinois State Federation of Labor.

Personally, I must admit, that I am not so sure of that, though it is said, that a scientist can give you in one sentence what a lawyer will take two paragraphs for. Too many members of the legal fraternity, either directly or indirectly care more for the financial welfare of the insurance companies, than they do for the welfare of the common people. They know which side their bread is buttered on. The insurance companies are worried about their dividends and many may refuse to renew their policies. A compensation fund could be created by the state; of course, this would be bitterly fought by calling it socialism, if for no other reason.

The employers could meet this challenge through prevention and control — prevention of conditions which are contributory to the contraction of diseases, and control of such conditions as may encourage or augment them. It is to be hoped, to use a little slang, that the professional ambulance-chaser will then become a negligible quantity.

I could tell you a whole lot more about all of the details involved and our efforts to get the American Federation of Labor interested in a Federal bill to enforce descriptive labeling, which is a big order. I will say this, that every worker should become vitally interested. Brother John Runnberg, who had this problem under consideration for many years and myself shall try our level best to make this question not only a state issue, but a national one as well.

It is for you to back up this effort to the limit.

In conclusion: Let us get busy and carry on in the spirit of progress in spite of the formidable opposition, to attain what rightfully belongs to us: protection against and compensation for "industrial accidents" and "occupational diseases" and let us fight to the proverbial last ditch to get them.

Report of Pennsylvania Commission on Compensation for Occupational Diseases

THE Conclusions of the Commission are as follows:

1. The Commission recognizes that provision has been made for the inclusion of occupational diseases within the scope of compensation by the constitutional amendment of 1915.

2. The Commission is definitely convinced that any compensation law including occupational diseases within the compensation system of the state of Pennsylvania would require a separate act with a separate framework of rules and procedure for the administration of such law in so far as occupational disease presents a problem different from that presented by accidents. In its other general provisions, such as benefit levels, it would incorporate by reference the compensation act at present in effect.

3. The Commission is of the opinion that occupational disease legislation should recognize that accidents happen at a given point of time with a particular employer, that occupational diseases are frequently of slow development, clear up and recur, and that special provisions fitted to this difference in character must be made.

4. Your Commission is likewise convinced that the phrase "occupational disease" has a distinct significance, but that it is not capable of such accurate definition that administrative boards and courts will be able without the assistance of scientists to determine what is or is not such a disease. It is further convinced that this question should be definitely outlined by a schedule listing the special diseases to be covered.

5. The Commission is also of the opinion that in connection with a listing of diseases there should be a general statement of the occupations within which those diseases naturally occur. The intent of such statement of listing as to limitation and or presumption should be stated in the Act.

6. Your Commission is of the opinion that the framework of an Act should contain in addition to the schedule and the description of occupations, provisions relating to the following matters which would be applicable to all occupational diseases:

(a) Payment of compensation should be confined to diseases due to the nature of and arising out of the claimants' employment.

(b) The date of disability should be held to correspond to the date of the accident or injury in determining the time to which the obligation to pay compensation should relate.

(c) Limitations relative to the filing of claims distinctly appropriate to occupational diseases should be provided for.

(d) Provision should be made recognizing the possibility that the disease may have arisen during different periods of employment under different employers in order to determine which employer or which employers shall pay the compensation.

(e) Provision should be made also to protect the employer in the payment of compensation against a wilful misstatement of prior history on the part of the employee, or in the payment of compensation in the case of a disease, the occurrence of which or the disability incident to which, shall be due to the wilful act of the employee.

7. Your Commission is of the opinion that the diseases which will be of major importance and which will present the greatest difficulties as administrative problems, are silicosis and or miners' asthma, and further believes that any act which includes them as compensable diseases must contain special provisions outlining the course of procedure to be followed in determining in a given case whether or not a claimant is entitled to compensation, and which employer or employers shall be held liable therefor.

8. Your Commission is convinced that the proper administration of an occupational disease act requires expert scientific determination of the broad question as to what is and what is not an occupational disease, and also to determine in any given case whether a claimant is suffering from an occupational disease due to the nature and arising out of his employment. It is, therefore, urged that any act adopted should provide for the appointment of a Board, in membership in which should be individuals possessing special medical and chemical knowledge, their findings to be regarded as conclusive in the field of the special knowledge.

9. The Commission is of the opinion that it is impossible accurately to estimate the additional cost which will be imposed upon industries by reason of the inclusion of occupational diseases in a compensation system.

10. The Commission has intentionally avoided making a recommendation with regard to the broad general question of the wisdom of the enactment of an occupational disease compensation law either at the present time or hereafter. It has regarded itself as a body whose function it is to present the various phases and problems involved in such a law if one is considered desirable by those charged with such responsibility. The members of the Commission are fully aware that additional research would throw more light upon the various questions involved. It is believed that the direction which such additional studies should take is indicated in the various sections of the report. The desirability of an early report and the demands made upon the time of the members of the Commission have prevented further investigations which would add much of value.

11. The Commission, appreciating the lack of sufficient information as to the exact nature and prevalence of chronic incapacitating miners' asthma, unanimously recommends that a survey be made by the U. S. Bureau of Public Health Service with the cooperation of both the employers and employes in the anthracite coal regions.

A. M. BOYD, President Pennsylvania Self-Insurers, Association.

ALEXANDER FLEISHER, Ph. D., Managing Director and Secretary Philadelphia Child Health Society.

WESLEY M. GRAFF, M. E., New York City, Director, Safety Engineering Division National Bureau of Casualty and Surety Underwriters.

THOMAS KENNEDY, Hazleton, International Secretary and Treasurer United Mine Workers of America.

A. J. LANZA, M. D., Assistant Medical Director Metropolitan Life Insurance Company.

R. V. PATTERSON, M. D., Dean, Jefferson Medical College.

LOUIS B. F. RAYCROFT, Electric Storage Battery Company.

H. F. SMYTH, M. D., Assistant Professor of Industrial Hygiene University of Pennsylvania.

WILLIAM P. YANT, Ph. D., Superintendent, U. S. Bureau of Mines Experiment Station.

T. HENRY WALNUT, Philadelphia, Attorney, Chairman of Commission.

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

THE object of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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Davenport, Iowa

THE 1935 Annual Meeting of the American Association of Industrial Physicians and Surgeons will be held in Philadelphia, Penna., on June 10th and 11th.

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* Deceased

THE first meeting of the Commission held in October of 1932 was devoted to a preliminary discussion of the matter and of organization. The members of the Commission were all familiar with the subject, but from different points of view, all of which were necessary to its complete understanding.

There was a scientific question involved, largely medical and chemical, as to what constituted occupational diseases, as to the process in which they arose, as to their prevalence in Pennsylvania, and as to the methods of determining their existence in given cases.

There was a financial question involved which related to the effect of the inclusion of occupational diseases as an addition to the present system of compensation for accidents, upon insurance rates and upon the cost to self-insurers.

There were, more generally speaking, the respective points of view of employers and employees who would be the persons most directly affected.

Finally, there was the legal question which ultimately it was necessary to consider in connection with concrete legislative expression.

All of the members were keenly interested in the subject and felt that they would not properly carry out the purposes of the Commission unless they went into the inquiry with open minds and endeavored to get all the information possible and make that information available as the basis for legislative discussion and legislative action.

With that purpose in mind the Commission organized with Mr. T. Henry Walnut as Chairman. A medical committee was appointed consisting of Dr. Ross V. Patterson as Chairman, Dr. Anthony J. Lanza, Dr. H. F. Smyth, and Dr. William P. Yant as members. A committee on scope and cost was also appointed of which Mr. Louis B. F. Raycroft was Chairman, and Mr. A. M. Boyd, Mr. Wesley M. Graff, and Mr. Alexander Fleisher were members. Finally, a legal committee whose inquiry should refer more particularly to specific legislative proposals, consisting of the Chairman and Mr. Thomas Kennedy was appointed.

John Campbell and Elizabeth B. Bricker, M. D., from the Department of Labor and Industry, acted as Secretary and Assistant Secretary, respectively.

The several committees reported back to the Commission. Their individual reports are herewith submitted in full, and follow a summary of each of the three reports.

Summary of the Report of the Medical Committee

THE Medical Committee, after commenting upon the two legislative methods of handling the subject of occupational diseases; namely, the one by which such diseases were included by general reference and the other by which such diseases were specifically designated by name and by indication of occupations in a schedule embodied in the act, recommended that for practical administrative purposes the latter should be the method followed.

As illustrative of its reasons the Committee pointed out that without a schedule much difficulty would arise in interpreting the intended scope of the law and that abuses would creep in owing to lack of information on the part of administrative officials relating to industrial diseases and their disabling properties. The schedule would remedy some of these difficulties by accuracy of definition of the diseases. It would also give a base for the estimation of carriers' charges and if properly prepared, the schedule would represent the present status of knowledge concerning industrial or occupational diseases.

The recommendation was accompanied with the statement that no schedule could be drawn which would take into account all existing occupational diseases and certainly not all of those which might ultimately be discovered to be occupational, but the advantages of accuracy of definition would out-weigh any such short-comings in the list.

In submitting a specific schedule the Committee included not only a list of diseases, but a corresponding list of occupations in which those diseases ordinarily occur.

Their schedule, with "Description of Disease" and "Description of Occupation" in parallel columns, is as shown on the following page (p. 84).

In commenting upon the schedule the Medical Committee pointed out that it had given consideration to those diseases of potentially frequent occurence in Pennsylvania, that it had not attempted to include all diseases which had been reported as occupational. The list in the Committee's opinion would cover approximately 90% of all occupational diseases occurring in Pennsylvania and "a much longer list would be required appreciably to increase the coverage." This comment was coupled with the suggestion already referred to that no list could be prepared which would include all possible occupational diseases for knowledge on the subject was growing and there were continual changes in industry with an accompanying effect upon the list.

Description of Disease	Description of Occupation
1. Poisoning by lead, mercury, phosphorous, arsenic	Any occupation involving the handling of or hazardous exposure to lead, mercury, phosphorus, arsenic, their preparations or compounds.
2. Poisoning by methanol, carbon bisulphide naphtha, or volatile halogenated hydro-carbons	Any occupation involving the handling of or hazardous exposure to methanol or any preparation containing methanol, carbon bisulphide, naphtha, or volatile halogenated hydrocarbons.
3. Poisoning by manganese dioxide	Any occupation involving the handling of or hazardous exposure to manganese dioxide.
4. Brass or zinc poisoning	Any occupation involving founding or refining of brass or the melting or smelting of zinc.
5. Poisoning by benzol, or by nitro- and amido-derivatives of benzol (dinitro-benzol anilin, and others)	Any occupation involving the handling of or hazardous exposure to benzol or nitro- or amido-derivatives of benzol or its preparations or compounds.
6. Compressed air illness	Any occupation carried on in compress air.
7. Destruction of tissue by radium or x-rays	Any occupation involving the use of or direct contact with, radium, radioactive substances, and x-rays.
8. Chrome ulceration	Any occupation involving the use of chromic acid or bichromate of ammonium, potassium, or sodium or their preparations.
9. Epitheliomatous cancer or ulceration of the skin or of the corneal surface of the eye due to tar, pitch, bitumen, mineral oil, or paraffin, or any compound, product, or residue of any of these substances	Handling or use of tar, pitch, bitumen, mineral oil, or paraffin or any compound, product or residue of any of these substances.
10. Infection or inflammation of the skin on contact surfaces due to oils, cutting compounds, or lubricants, dust, liquids, fumes, gases or vapors	Any industrial occupation involving the handling or use of oils, cutting compounds, or lubricants or involving contacts with dusts, liquids, fumes, gases, or vapors.
11. Anthrax	Handling of wool, hair, bristles, hides or skins, and bodies of animals, either alive or dead.
12. Silicosis	Any occupation involving exposure to the dust of silica (SiO_2).
13. Chronic incapacitating miners' asthma See Note (b) in Summary of report of Medical Committee	Coal mining industries.

In connection with the second column under the heading of occupations the Medical Committee recommended that this column should not be restrictive in the sense that it would limit the recovery of compensation to diseases occurring to employees engaged in those particular occupations. There was, however, an exception suggested in connection with item listed as No. 13, namely, "Chronic incapacitating miners' asthma" compensation for which should be confined to employes engaged in the "coal mining industry."

MINERS' asthma and silicosis were given special consideration by the Medical Committee. Primarily, it was thought that a large number of claims for compensation made would be because of these two diseases. Moreover, they represented peculiar problems because of their nature, particularly their slow development over a period of years with different degrees of disability incident to the particular stages of development.

Of the two diseases arising from the breathing of dust, miners' asthma is peculiar to the coal mining industries silicosis may arise from the breathing of silica dust in industries other than coal mining or mining of any sort. They are, however, related basically as dust diseases and miners' asthma is frequently involved with silicosis.

SILICOSIS. The Committee recommended in connection with silicosis the following:

"For the purpose of compensation silicosis shall be considered a disease of the lungs, due to breathing air containing silica (SiO_2) dust, characterized anatomically by generalized fibrotic changes in both lungs, with a development of miliary nodulation, demonstrable by x-ray examination."

The Committee then proceeded to a discussion of silicosis in which it points out that:

'The disease is divided arbitrarily into first, second, and third stages for convenience of description and possible compensation purposes."

The symptoms and showings incident to the three stages are presented and in conclusion the Committee recommends that:

"Silicosis. at any stage, when complicated with active pulmonary tuberculosis, shall be deemed total disability; in the absence of such infection only second and third stages shall be compensable."

As an administrative corollary to the payment of compensation for silicosis the Committee recommends:

"In order to establish a claim for compensation for silicosis, the claimant must have had the equivalent of two years' aggregate employment in the state of Pennsylvania, all occurring after the passage of the act, in an occupation or occupations recognized as involving exposure to silica dust."

MINERS' ASTHMA. The subject of "Chronic incapacitating miners' asthma" presented a serious problem to the Medical Committee. In the first instance the use of the term was not considered entirely satisfactory or scientific. It was employed, however, because it indicated an affection well recognized under that title in the coal fields, both by the laity and the medical profession. In the second instance, it represented the chief disability growing out of anthracite coal mining.

It was, therefore, pointed out that the term used indicates a disabling consequence rather than the underlying causative condition and is, therefore, a symptom complex rather than a pathological entity.

It is pointed out that it is not feasible to include anthracosis itself as a compensable disease because of its prevalence.

It was appreciated by the Medical Committee that miners' asthma which is incident to anthracite mining was of very great moment in the industry and that there was no comparative experience in any other state or country which would be of use in determining the extent of the disease as a compensable condition. The effect of soft coal mining upon workers in the mines is different from that of anthracite.

The Medical Committee engaged in a painstaking effort to secure information relative to the incidence of disability among hard coal workers as a result of their occupation.

The result of the inquiry is set forth in the report. It is based upon information secured from physicians and hospitals in the anthracite region. The question was further complicated by the advisability of grouping miners into three classes:

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'(1) Those almost entirely engaged in rock drilling with the use of the jack hammer.

(2) Those largely engaged in coal mining, but occasionally using the jack hammer or drilling in rock.

(3) Those engaged almost exclusively in mining coal."

There is a difference of exposure in the three groups and a difference in the involvement of the condition with silicosis.

As a result of the replies received by the Medical Committee, it would appear that approximately 22% of the whole group of miners are suffering from miners' asthma and are either partially or totally disabled thereby.

The more active symptoms are, of course, incident to the miners engaged in rock drilling wherein the dust inhaled contains silica.

NOTE (b)—Special Discussion on Chronic Incapacitating Miners' Asthma. With respect to chronic incapacitating miners' asthma, the Medical Committee is of the belief that there is a disabling occupational disease of this character. Appreciating, however, the lack of any precise information as to the exact nature and the prevalence of this disease, the Medical Committee wishes to go on record as recommending that a further study and investigation of occupational diseases among anthracite coal miners be made by the U. S. Bureau of Public Health Service with the full cooperation of the United Mine Workers of America and of the coal operators in the anthracite region. The United States Bureau of Mines in cooperation with the U. S. Bureau of Public Health Service has conducted many such investigations and is now concluding a study of occupational diseases among bituminous coal miners in West Virginia, making possible a correlation of the facts ascertained from that study with those which would be obtained from a study in the anthracite region.

In any case, in order to establish a claim for compensation for chronic incapacitating miners' asthma, the claimant must have had not less than five years' aggregate employment in the coal mining industry in the Commonwealth of Pennsylvania, two years of which must have occurred after the passage of an Act.

THE Medical Committee has added to its discussion comments upon the various diseases included in its schedule although these comments are less detailed than those relating to silicosis and miners' asthma. It has also included a discussion of a number of other diseases which are not set forth in the schedule, including anthracosis, asbestosis, pneumonoconiosis from cement dust, and siderosis, with the reasons for not including these diseases as compensable occupational diseases. It has also added an additional schedule of diseases which are sometimes referred to as occupational together with a brief statement of the reasons for excluding them from the schedule.

The Medical Committee was impressed with the fact that the administration of a compensation act covering occupational diseases required the application of expert scientific knowledge to the determination of whether or not certain occupations gave rise to an occupational disease and whether or not in any given instance a claimant was suffering from such disease and in particular, in connection with silicosis and miners' asthma, whether or not development of the condition had reached the point of disability contemplated by the act. The Medical Committee was convinced that unless expert medical and scientific services were provided for the determination of the questions indicated, the administration of the act would be highly uncertain and the result would be unsatisfactory.

The Medical Committee expressed the opinion that from its observation of the decisions of compensation tribunals and courts such decisions were replete with statements which persons familiar with the complexities of the subject involved, namely, that of diseases and pathological conditions, could readily recognize as incorrect to the point of absurdity.

The Medical Committee, therefore, recommended that a medical board be created to assist in the operation of the act, and that its findings as to whether or not certain conditions from which the claimant was suffering were due to an occupational disease derived from given employments should be final. Furthermore, that this board should keep abreast of the development of understanding in relation to occupational diseases and from time to time make recommendations relative to the inclusion or exclusion of diseases from the list of those made compensable.

The Medical Committee further suggests specific qualifications for appointment to such a board and points out that the field to be covered is a highly specialized one and is confined largely to physicians devoting their attention to industrial hygiene and industrial health. In particular it recommends that at least one member of the board should have special clinical experience in connection with silicosis and miners' asthma as these two diseases would probably represent a large number of claims.

The Medical Committee is of the opinion that such a board containing members specially qualified and permanently appointed under proper safeguards to insure their non-political character, would aid immeasurably in the satisfactory administration of an occupational disease act.

Summary of Report of the Committee on Scope and Cost

THIS Committee endeavored to determine the effect which occupational disease legislation would have both as to the extent of its application to Pennsylvania industries and to its probable cost. Study was directed to the legislation and experience of other states and to statistical and actuarial facts.

The Committee stated that there was no available report which represented a thorough investigation into this question prior to the adoption of legislation by any other state. It, therefore, was called upon to develop its own procedure.

It pointed out that there was considerable variance in the statutory provisions of the several states some of which, such as California, Connecticut, Masachusetts, Missouri, North Dakota and Wisconsin, provide compensation in general terms. The other states, compensating for occupational diseases, Illinois, Kentucky, Minnesota, New Jersey, New York and Ohio, confined their coverage to scheduled diseases. This variation in legislation was necessarily considered in connection with the experience in the several states.

For the purposes of its examination, the Committee confined itself to what are distinctly known as occupational diseases as opposed to diseases generally. As the Committee pointed out, to include diseases generally would in effect make the law a form of health insurance. Again the Committee suggested that in certain industrial communities the phrase "occupationad disease" might be so interpreted as to constitute for practical purposes a coverage for old age insurance or unemployment insurance.

To establish definite confines for an act, the Committee was of the opinion that the specific diseases to be covered should be set forth in the act itself in the form of a schedule which schedule should include all the occupational diseases which are currently understood to be of real importance in Pennsylvania. In addition to the advantage to be derived thereby in anticipating costs, the Committee was of the opinion that such a list would lead to a better mutual understanding as to the scope of the act between employer, employe, and insurance carrier and that it would materially simplify the problem of administration.

The committee was of the opinion that the intent of an occupation column should be definitely stated because, as it stated, the cost will be seriously affected by the limitation or by any direct or implied presumption of an "occupational column" and also by the interpretation of word "hazardous," but the latter difficulty will be removed if there is a competent medical board with power.

TREND of Current Costs. The Committee has pointed out the trend of the cost of compensation since the general adoption of such acts. This trend has been upward in so far as it relates to compensation for accidents and, in the judgment of the Committee, this is a factor to be taken into consideration in connection with the proposal to extend the present coverage.

The Committee points out that this trend is due, in the case of Pennsylvania, at least, to amendments to the act and to certain other factors which have added to the total cost.

As an offset to this, the Committee suggests that there is a liability at common law for occupational diseases incurred by the employee when negligence on the part of the employer can be shown. The extent of this liability expressed in figures cannot be established inasmuch as there is no possibility of determining how many cases are brought in different jurisdictions, how many cases are settled and how many cases result in verdicts.

It is assumed, however, that this common law liability represents a real menace to industry.

There is a further element which was considered by the Committee in connection with the trend of costs which relates to the present industrial situation. This question is a very grave one. It is emphasized by quotations from a recent report of the Industrial Commission of Ohio which indicates that the cost per claim for compensation cases materially increased in 1931 over 1929, due, as suggested, to the tendency to convert compensation insurance into unemployment insurance, and which further suggests that there is an additional pressure to prolong the treatment of injured workers which has added to the average medical cost. The payments of compensation are not decreasing in proportion to the reduction of premiums which are based upon payrolls. As a result of these several factors, there has been a severe drain upon the insurance fund of Ohio and a necessary increase in the rates that are required to be charged.

PROBABLE Costs of Occupational Disease Compensation. The Committee undertook to measure the effect which compensation for occupational diseases would have if applied to Pennsylvania industries by taking into account; first, the diseases for which compensation is proposed; and, second, the extent of the employee exposure to those diseases in Pennsylvania.

The Committee, therefore, took the schedule of diseases contained in the report of the Medical Committee and attempted the preparation of a list showing the approximate number of industrial wage earners in Pennsylvania exposed to the diseases so listed and the approximate amount of their wages in 1929, the most recent year for which statistics are available.

The Committee further undertook to compare the number of employees engaged in industries subject to the diseases mentioned in the schedule with similar figures in other states having occupational disease compensation and by determining the cost of such compensation in the other states, it was expected that the anticipated cost to Pennsylvania could by comparison be determined. The Committee found this line of inquiry unproductive.

The Committee also endeavored to secure from states, having occupational disease provisions in their compensation laws, information as to costs, in particular the relation of the costs of occupational disease compensation to cost of compensation for accidents, and in this connection the experience of New York, Wisconsin, California, Ohio, New Jersey and Minnesota are set forth. These figures would indicate that in the states considered the percentage of claims for occupational disease is not in excess of 3% of the total of the claims made, including those arising out of accidents; and that payments in Ohio, made on account of claims for occupational diseases represent less than 1½% of the total of the payments for accidents.

As a further line of inquiry, the Committee then turned to an occupational disease compensation rating plan recently developed by the National Council on Compensation Insurance from an engineering and underwriting investigation of occupational disease costs. That plan contemplates a flat general occupational disease coverage rate, applicable to all industrial classifications, plus a specific occupational disease coverage rate applicable to certain definite industrial classifications, both to be in addition to the rate for accidental injury coverage. The plan proposed is in effect a projection of the insurance carriers' experience in point of occupational disease compensation costs.

Based upon the census figures for 1929, the occupational disease charge was estimated at eight and four-tenths cents per $100 of manufacturing payroll, as compared with an average compensation rate for the policy year 1929 under the accident law of about eighty-two cents. The increase in cost due to occupational disease would, therefore, be approximately 10%. The Committee expressly pointed out that its figures did not include chronic incapacitating miners' asthma or silicosis in the mining industry.

The difference between the figures based upon the experience derived from other states and the costs as anticipated by the National Council on Compensation Insurance is so wide that it cannot wholly be explained by differences in legislation. It is pointed out as pertinent that the insurance companies are asking for increased rates in order to enable them to carry the risks.

As a result of its analysis, the Committee stated that if compensation for occupational disease disability is considered desirable, legislation should provide that:

"(1) The disability is actual and well defined.

(2) The source of the disability is actually in the industry and occupation in which the person alleging disability has been employed.

(3) The responsibility for disability be fairly fixed on a specific employer or be fairly apportioned among several employers.

(4) The administration of the law be definite and be so safe-guarded as to limitations that the cost of compensation can be estimated in advance so that the insurance principle can be applied to such compensation."

Summary of Report of Legal Committee

THE Legal Committee approached the problem by first considering the amendment to the Constitution of the Commonwealth of Pennsylvania adopted in 1915 to Section 21 Article 3 thereof which reads as follows:

"The General Assembly may enact laws requiring the payment by employers, or employers and employes jointly, of reasonable compensation for injuries to employes arising in the course of their employment and for occupational diseases of employes, whether or not such injuries or diseases result in death, and regardless of fault of employer or employe, and fixing the basis of ascertainment of such compensation and the maximum and minimum limits thereof, and providing special or general remedies for the collection thereof."

In view of the phraseology of the amendment, the Committee was of the opinion that any act drawn would necessarily be confined to "occupational diseases" and that this phrase had a distinct meaning in common speech although its boundaries were vague. It is recognized that it was not possible to frame a definition which would include such diseases as were occupational in nature and exclude general diseases arising out of the employment. It was, therefore, considered advisable in the interest of administration to define occupational diseases by reference to the specific diseases to be included within the act.

The Committee also recognized that it would be inadvisable to undertake to include occupational diseases within the present Workmen's Compensation Act of 1915 without providing for a method of procedure distinctly applicable to such diseases. It is clear that there are many distinctions between accidents and diseases when it comes to determining questions relating to compensation therefor.

The Committee was further impressed with the merits of an act in-

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cluding a schedule of diseases as against an act which included diseases merely by a general term.

It may be true that certain diseases, occupational in nature, may be excluded if reliance is placed upon a schedule, but it is certainly true that it is unwise practice to impose upon administrative and judicial officers, the duty of determining the very complex question as to what is and what is not an occupational disease inasmuch as this phrase has both legal and scientific implications.

The question of what is or what is not an occupational disease should be determined in advance of litigation by scientists versed in the subject such as the scientific members of the Commission.

The Legal Committee is further satisfied that the schedule of diseases should contain a corresponding column indicating the occupations incident to which the diseases naturally arise and that this column while not binding upon the employer should be used to simplify the problem of the administrative officials in determining the source of an occupational disease.

It is further suggested by the Committee that the time of disability, rather than the date of the exposure and the incurring of the disease, be fixed as the date from which the obligation to pay compensation shall be dated and the date upon which certain duties shall arise on the part of the claimant.

It is further suggested by the Committee that the time for filing a claim shall be related to the date of termination of the employment as well, perhaps, as to the disability, this being the rule followed in the British act and in all of those acts of Canada and the United States which have followed the British statute. There can well be a provision extending the time within the limits upon the recommendation of disinterested and competent medical authorities if in fact injustice will be done when the ordinary limitation is strictly applied.

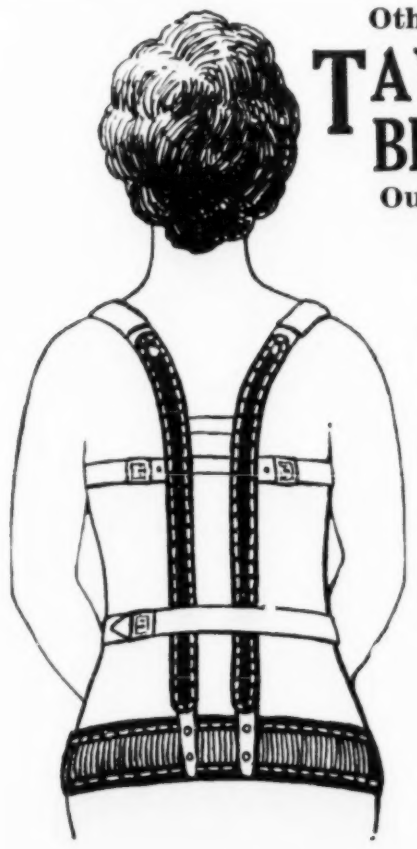
In the case of silicosis and miners' asthma, special limitations as recommended by the Medical Committee and Cost Committee could be imposed.

It is further suggested that the employer in whose employ the claimant was at the time of the disability, shall be the one who shall pay the compensation provided that his employment was the one wherein the claimant's disease was contracted or aggravated with the possible addition of a provision by which such employer can secure contributions from prior employers.

Provision is also suggested whereby the employer can protect himself by securing from the employee at the time of employment a statement of previous attacks of the disease which is naturally incident to the employer's business.

The Legal Committee approves of the suggestion of the Medical and Cost Committees to the effect that competent medical and scientific service shall be secured in connection with the administration of the act. It feels that such assistance would be highly important in securing satisfactory administration. The questions involved will frequently be scientific. Persons qualified to speak thereon will be confined to those who have made a special study of the subject and in the case of silicosis and miners' asthma, which are diseases of a progressive nature, compensable in accordance with the Medical Committee's recommendations only when disability arises a peculiarly difficult question will be presented in determining the stage of development of the disease.

If a medical board were appointed or medical advisers were secured whose judgment would receive general approval, it is anticipated that most of the difficulties which are expected to follow the passage of an occupational disease act would be met with a reasonable solution.



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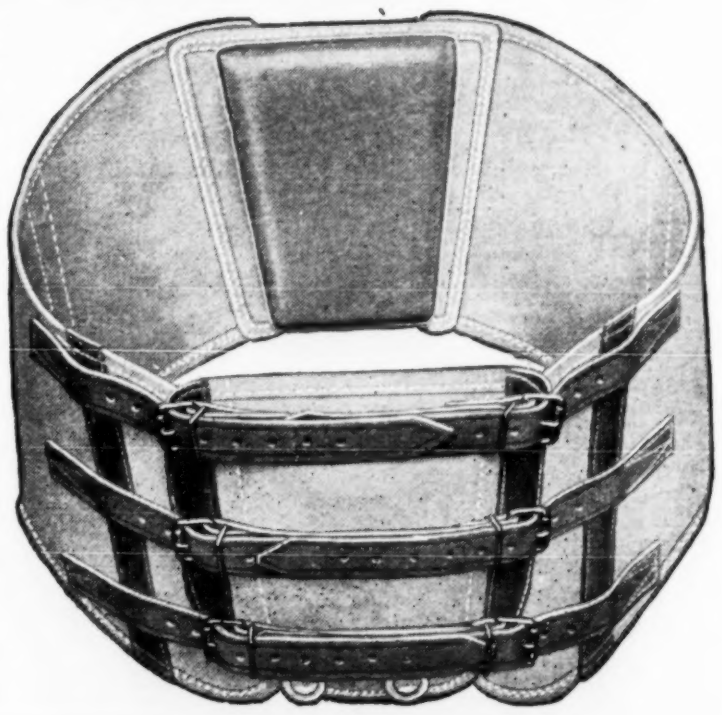

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The Place of the Doctor in Factory Inspection

By Dr. L. Teleky*

FOR many years the problem of the diagnosis of lead poisoning consisted in the search for the pathognomic symptom, i.e., a symptom always produced by lead poisoning and never by any other disease, so that it infallibly leads to the diagnosis "lead poisoning." The demand for this came from engineers (supported by a few research workers in medical laboratories), for no medical practitioner would ever have suggested looking for such a symptom, since they all know that no disease has an infallible symptom of this kind.

For many years the path for the entry of lead poisoning into the system was supposed to be from the soiled hand to the mouth—to the engineer a very obvious one, and to be stopped by the simplest technical means (washing facilities). A German engineer once asked the manager of a lead foundry where it was quite easy to see the lead fumes whether lead could not be absorbed by inhalation or through the skin, but no notice was taken. It was Dr. Legge who was the first to attack the question seriously and by experiments on animals and industrial hygiene research to prove the overwhelming importance of the absorption of lead through the mouth by inhalation.

Is seems simple to the engineer to protect the worker against dust and fumes by a respirator, and he regards workers who refuse to wear a respirator as careless or obstinate. Various doctors (Schablowski, Brezina, Legge), however, have shown how imperfect the protection so afforded is and how much these respirators hamper breathing.

During the sixties and seventies of last century doctors were interested in the problem of pneumoconiosis, not for reasons of industrial hygiene, but on purely medical and pathological grounds. They found that the chief source of risk was quartz dust and that the size of the particles found in the lungs was a rule only 1-3u. With the discovery of the tubercle bacillus this group of doctors lost interest in pneumoconiosis, and the engineers who now began to study the problem produced drawings and charts which indicated the existence of much larger particles, the new idea being that injury was the result of the mechanical action of the shape only of the particles. The error of this conception persisted until exposed by certain doctors (Watkins-Pitchford, Mavrogordato).

Technical accident prevention has been carried on for decades and with great success, but doctors (Vernon, Greenwood) and psychologists were the first to draw attention to the influence of the atmospheric conditions of the workplace and of personal predisposition on the frequency of accidents.

The point of view from which an engineer regards these problems, and the conditions in which he does so, are in fact quite different. They lead him to ask wrong questions and prevent him from putting forward the most important points. But it must also be remembered that only a medical man knows whether the questions raised can be answered at all with the means available, and whether the money and trouble to be spent bear a reasonable relation to the importance of the problem and the partial solution that can be obtained. Here again some examples may be given.

It seems very simple to the non-medical man to settle the question whether emphysema is particularly frequent among sheet-glass blowers. In fact, a very large number of workers must be examined, not only by percussion but also with the spirometer, in order to determine whether emphysema is more frequent among them than among other workers of similar age and engaged in similar heavy work. But this question at any rate can be settled if enough time and money are spent and if sufficient material for investigation is available.

If, however, the question to be answered is the frequency of gastro-intestinal diseases, the difficulties are even greater. The present objective means of determining alterations in the gastric juice depend on examinations with the stomach-pump; while these have been carried out on a surprisingly large scale by Russian doctors, they are as a rule impracticable in mass investigations. X-ray photographs have so far given information on a few changes only (e.g., ulcer scar, atony). Practically the only possibility today, therefore, is to use subjective data, a method which is clearly unsatisfactory and unreliable. We can only hope that the further developments of x-ray technique that are in prospect will provide new means of examination in a not too distant future.

To a layman it seems easy to determine the general state of health and the effect of occupation on health by a study of sickness fund statistics; and yet how difficult it is in fact to obtain even partially dependable results from them.

THE organisation of the work of the industrial medical service must thus lie in the hands of a qualified medical expert who can assess the difficulties and potentialities of the enquiries undertaken; at the same time, both he and each individual industrial medical officer must have power to take action where they consider it to be necessary in the interests of labour protection, whether in individual cases or for more far-reaching enquiries. Even if the industrial medical officer is regarded as the "adviser" of this colleagues of the technical inspectorate, this must not be taken to mean that he should wait until he is asked for advice. Besides the many psychological inhibitions to be overcome by anyone asking for advice—e.g., anxiety lest the mere fact of asking a question may lay bare a weakness—there may be failure to recognize risks to health through ignorance, failure to notice slight physical complaints and changes, acceptance of easy explanations of sickness and injuries to health such as susceptibility, carelessness, previous illness, etc.; above all, there is the idea that anybody understands medicine, and therefore of course any engineer, even though he may not credit the doctor with the slightest understanding of the simplest technical question. The doctor should not have to wait, therefore, until he is asked for advice; he must give his advice unasked and have the right to convince himself as to the existing conditions on his own initiative; he must be able to inspect a factory unordered and unasked. His right to inspect factories must be completely unrestricted.

For yet another reason, however, it is impossible in the field of factory inspection in particular, as in that of hygiene in general, to make the doctor subordinate to the engineer or in any way dependent on him. In the field of industrial hygiene it has always been the doctors who have pressed for action and taken the initiative, since in their eyes all that is done must center round the human element, to whose welfare economic interests must be subordinated, and also because it is they who ascertain the existence of injuries and defects and recognize their sequelae. Engineers, on the other hand, are those who act; they devise safeguards and innovations for the removal of defects, carry them into effect, or see that this is done. At the same time they exert a retarding influence because they are more clearly aware of economic and material difficulties. But when innovations have been introduced, it is the doctor's business to examine whether they meet the demands made on them and whether all injuries to health are averted. It is he who controls what has been devised by the engineer. From the point of view of efficient labour protection, however, it is not practicable to place officials who are responsible for initiative and control under those who are responsible for taking action.

In brief, the industrial medical service must be under medical leadership. It must be completely independent of other official bodies, and there must be no restrictions on its right to inspect factories, its work, and its research. * * *

SO FAR one has spoken of industrial medical offciers themselves and their field of activity. The men called on to carry out this work of research and of advising the central authority must not only have quite special personal qualifications, but must be able to draw on special resources and to cover a large area. As regards resources, a small laboratory is certainly necessary, which may be specialised according to the individual officer's special knowledge and personal inclination. But the laboratories of all industrial medical officers are on the small side and, the writer holds, rightly so. No laboratory could be large enough to meet

* *International Labour Review*, January, 1935.

all the needs of an industrial medical officer or to carry out all the investigations he requires. Besides, nowadays all science is specialised, chemistry as much as medicine. It seems quite impossible for any one institution of the kind to employ all the assistants the industrial medical officer needs for his investigations. In my opinion the only practicable course, and indeed the only right one, offering every guarantee for his investigations, is that the industrial medical officer should collaborate now with one and now with another technical laboratory or specialist, just as he may need them for his enquiries, and that the organisation of his work and his personal relations with the various authorities should be of such a nature that these resources are at his disposal whenever necessary. Part of the work of all industrial medical officers has always been done in conjunction with other specialists, and this kind of collaboration, in which the Americans have set a notable example, appears in these days of far-reaching specilisation to be the only right kind. It is important to note, however, that laboratory work alone cannot lead to any progress in the field of industrial hygiene, and that laboratories and institutions cannot replace the industrial medical officer's own activities. Laboratory research, as many examples go to prove, is always in danger of losing itself in theoretical considerations, and of trying to solve theoretical problems that are, at least for the time being, of no practical importance. Often, too, it ignores the kernel of the problem from the practical standpoint. It cannot accomplish much without the collaboration of the practitioner, who directs it towards the important problems and invites it to answer questions of practical significance. Progress in industrial hygiene can be achieved only by the industrial medical officer and the laboratory together, and not by the latter working alone.

The area covered by the industrial medical officer must be large enough to include a great variety of industries, including also some of the rarer branches of manufacture. It must in any case contain a fairly large number of factories, as nothing else will enable him to compare different working methods. I am inclined to think that each industrial medical officer should deal with a population of three to six million, according to the proportion of industrial workers in it. But even so he ought to be able, in exceptional cases, to visit undertakings outside his area.

Where the number of doctors in the factory inspectorate is higher than this proportion (e.g., Belgium, the Netherlands), the factory inspection reports show that only one or two of the doctors attached to the central office are industrial medical officers (Gewerbearzte) in the sense considered here. The others are medical factory inspectors (arztliche Gewerbeinspektoren), as in fact they are sometimes styled officially; the writer holds that this title is just as appropriate for the medical members of the inspectorate, who do not have to carry out important scientific and systematic investigations or advise the central authorities, as the corresponding title is for the technical members of the inspectorate. At the same time, it is considered absolutely essential to have such medical factory inspectors. The whole of factory inspection must be imbued with the medical spirit. The trained eye of the engineer is necessary to recognize those defects of machinery and construction which call for removal; the trained eye of the doctor is equally necessary to focus attention on the human element and to bring the medical standpoint into the numerous undertakings which the industrial medical officer cannot enter. It is not only in the central office, but also in factory inspection throughout the country, that the doctor and the engineer must stand side by side and work together. The industrial medical officers of the future should be drawn from among the ablest of these medical factory inspectors.

These medical factory inspectors should of course be under the orders of the head of the district concerned, but in all medical questions and in their activity as a whole they must come under the higher authority of the industrial medical officers, who may call on them to make special enquiries and to whom they should be able to turn in case of disagreement on medical matters with their immediate chief (cf. the Saxon regulations and also the organisation in force in Italy).

THERE are yet other medical services needed in factories. These are quite apart from the services of the "factory doctors" appointed on the private initiative of employers, who play an important part in the United States and also in many large European undertakings; in the present article, which is concerned only with the state factory inspection, it is not proposed to discuss their functions.

In Great Britain, the unreliability or lack of birth certificates made it necessary to appoint special doctors, called "certifying surgeons," to determine whether children entering factory employment were physically fit and had reached the statutory age, and to issue the necessary certificates. This need was felt earlier than it was in Germany, where the registration of births was adequately organised at an earlier date. The British factory inspectors were given the right to appoint the certifying surgeons in 1844. In Germany, the Bavarian Government decided in 1853 that no person should be admitted to the work of coating mirrors with mercury without the certificate of a medical officer. The authorities in other States left it to the employers to select the doctor to carry out the periodic examinations prescribed by law, until 1905, when the Federal Council for the first time issued an Order (on lead foundries) containing a provision that the examinations should be made by "a doctor authorised for the purpose by the higher administrative authorities, as notified by them to the factory inspector."

Today, in Great Britain and Germany, it is the duty of the industrial medical officers to collaborate in the appointment of these "certifying surgeons" and to supervise their work. The British factory inspection reports show what attention the medical inspectors of factories have given during the last 10 years to training the certifying surgeons (who now also issue certificates in regard to occupational diseases entitling workers to compensation) and to making their work as successful as possible. The reports of the German industrial medical officers also contain information on their activities in this field. In the Netherlands, too, the examining doctors are appointed by the factory inspection authorities, and work under the supervision of the industrial medical officers. Some of these examinations in the Netherlands, and also in Belgium, are carried out by the medical factory inspectors themselves.

It would seem that the medical officers of health would be the most suitable persons to act as certifying surgeons. If they have a full time appointment, they are equally independent of employers and workers, and their whole activity and training render them most suitable to carry on such prophylactic activity. They are also the most suitable for making the preliminary investigations into occupational diseases. In Great Britain the medical officers of health are often employed as certifying surgeons; in Germany, as investigating and certifying doctors ("qualified doctors"). This is the only field in which there is and can be any considerable collaboration between the industrial medical officer and the medical officer of health. Examining and certifying the state of health in all fields is one of the duties of the medical officer of health, whereas for other problems he would first have to study industrial conditions and master the difficult special duties involved in medical work in factories.

A CONSIDERATION of all that has been done by industrial medical inspection must lead to the conclusion that even if the number of industrial medical officers is small, they have done a great deal of useful work. Their work has laid the foundation for a large number of laws and regulations which aim at removing risks to the health of the workers in a great variety of undertakings, and especially risks leading to specific occupational diseases. This aim they have in fact largely succeeded in attaining. Anyone who has been engaged in work in the field of industrial hygiene for several years, or even who is acquainted with the literature of the last decades, or has had an opportunity of inspecting undertakings of the kind in question in countries with and without an industrial medical inspectorate, must agree that in countries with such an inspectorate the undertakings which formerly were particularly unhealthy and elsewhere still are (e.g., white or red lead factories, accumulator factories) have completely changed their general aspect and equipment. Moreover, the nature of the cases of disease has itself undergone a change. Cases of serious lead poisoning, serious lead cachexia, have become rare, although there are still cases of encephalopathy and paralysis. During barely four years of activity as medical officer for indus-

trial diseases to the important Vienna sickness funds (1909) the author reported on 42 cases of lead paralysis (an annual average of 10 for a population of two million), but in the following years, 1912 and 1913, the number of such cases was very rare. During the period 1926-1929, in his inspection district of Dusseldorf, which included a large number of lead paint factories as well as accumulator factories and lead and zinc foundries, the number of cases of lead paralysis for a population of six million, of whom 1.5 million were engaged in industry and handicrafts, was only 20, or five a year, and in the last two years there were only three a year. In the whole of Prussia (population 40 million) the number of cases of lead paralysis notified in 1929 was 31. The writer is convinced that the history of silicosis will be the same, and that in 10 years time there will be hardly any cases of acute silicosis and very few of serious silicosis.

The medical successes hitherto gained are not of course to be ascribed to the direct activities of industrial medical officers in individual factories, but much rather to legislation for particular kinds of undertaking and to insurance against occupational diseases, built up on the research and enquiries carried out by industrial medical officers and the experience they had accumulated. To some extent, however—and this the writer has learned from his own experience — they are the result of the direct intervention of industrial medical officers in particular undertakings.

It is not easy to produce reliable statistics showing the effects of medical inspection in whole countries. It would, for instance, be misleading to draw conclusions from the fact that in Prussia the number of cases of lead poisoning notified in the second year of compulsory notification (1927) was 1,529, and in 1932 it was only 699, because this would ignore the fact that the terrible unemployment of the latter year naturally reduced the number of cases of poisoning, and even more that of cases notified. The decrease, however, is in part the effect of legislation and inspection.

In general, in considering data based on the compulsory notification of diseases it must be borne in mind that they are only partially reliable, and then only when notification gives a claim to insurance benefit. Where this is not the case, no one has an interest in notification; on the contrary, the employer and very often the worker is more interested in not notifying. The most satisfactory data are those for Great Britain, where there has been insurance against occupational diseases since 1906.

For the sake of completeness the figures for 1900, the first year for which data are available, and for 1932 are included. In the latter year the very low figures are to be ascribed to the economic depression. The significant figures are those for the triennial periods 1906 - 1908 to 1926-1928, before the onset of the depression in 1929. In considering separate years, the fluctuations in the fluctuations in particular occupations, resulting from fluctuations in the volume of employment, have too great an influence. Thus in 1931 the number of cases of lead poisoning notified in the shipbreaking industry was only two, but in 1932 it was 36. In all the occupations the figures for which go to make up the total, there has however been a more or less marked fall, except in the accumulator industry. The fall is greatest, as Dr. Legge pointed out as early as 1912, in the white lead, pottery and china, transfer and colour industries, in which special regulations provided for the direct removal of dust by exhaust ventilation and periodic medical examination of the workers. Similar regulations have since been introduced in other industries. In file cutting, partly on account of the introduction of machinery, i.e., owing to technical progress, lead poisoning has disappeared altogether. In all other important groups of undertakings—the only one mentioned here—the figures have fallen heavily, especially in the manufacture of lead paints and in the pottery industry. In the manufacture and repair of accumulators they have apparently risen, but it must be remembered how much this industry has grown during the last 30 years; in 1900 it was only just beginning to develop, and now it employs several times as many workers as it did then. Anthrax has also diminished. In considering all these figures, however, it must be remembered that in normal economic conditions compulsory notification is always more complete when the workers are aware of the existence and advantages of insurance.

Period	Lead poisoning									Anthrax
	Total No. of cases*	Smelting of metals	Plumbing and soldering	Printing	File cutting	White and red lead works	Pottery	Coach and car painting	Accumulators	
1900	1,058	34	9	18	40	377	210	70	33	37
1903-1905	601	31	24	16	19	114	99	60	29	52
1906-1908	619	45	21	24	11	94	115	75	24	57
1909-1911	576	49	30	29	12	47	77	90	27	57
1923-1925	383	26	7	7	....	25	39	22	90	45
1926-1928	335	27	10	7	....	14	26	15	46	36
1932	193	16	5	7	....	4	9	5	16	16

* Including several branches not shown in the table.

Number of Cases of Lead Poisoning and Anthrax Reported in Great Britain, 1900-1932

AFTER this glance at the practical results, a survey of the development of industrial hygiene as a whole during the last few decades shows that since industrial medical officers were first appointed, and especially in consequence of their work, industrial hygiene has ceased to be empirical and has become a science. As long as it lay in the hands of the engineers it often worked on the basis of somewhat vague ideas about possible dangers to health and resulting injuries. Doctors concerned with industrial hygiene usually based their researches on experiments on animals, and it was often forgotten that the results so obtained cannot be applied to human beings without great caution, and that in general it is very difficult, if not almost impossible, to produce chronic injuries in such experiments. The enquiries made at that time by doctors in factories often give the impression that they did not realise and describe the actual conditions.

It was not until industrial medical officers got to work that the exact methods of modern science were applied to the investigation of industrial conditions. They introduced dust weighing, then dust counting, the South African konimeter, and in particular the Owens dust counter and the Greenburg and Smith impinger, in research work in industrial hygiene. They used exact instruments to measure the carbon monoxide content of the air, and Hills katathermometer and the effective temperature of the Americans Houghton, Yaglou, and Sayers to determine the atmospheric conditions of the workplace. After ascertaining the exact conditions, the next step was to determine their effect on human beings, including those effects which have not yet caused disease and death; and for this purpose large - scale investigations with all modern methods have been made. Thus the science of industrial hygiene has begun to acquire a firm foundation, but much still remains to be done.

It is sufficient to mention that in the matter of the effects of temperature on human beings we are still only at the beginning of our knowledge, that we have still no measure for the early stages of fatigue or "wear and tear" that ultimately leads to premature old age and incapacity to work, and hardly a reliable measure for its later stages. Industrial physiology has scarcely gained any footing in actual practice as yet.

It is possible that valuable practical results will also be obtained from research into constitutional types, for purposes of both vocational guidance and accident prevention.

As regards accident prevention, doctors must collaborate by further researches into the effects of atmospheric conditions, fatigue, noise, and lighting, and into the problem of persons with a marked accident proneness, and the possibility of curing them by psychotherapy, and of keeping them away from dangerous work.

But quite apart from its importance for accident prevention, research is necessary in the abovementioned fields (atmospheric conditions, fatigue, etc.).

The above are only a few of the important duties that can be seen to exist today, and it will be for the future to show the importance of many others. Here it will be sufficient to mention that in 1906 the famous hygienist, Max Gruber, in a report on the appointment of an industrial medical officer, expressed the opinion that it would be quite wrong for doctors to have to supervise the general and elementary hygienic equip-

ment whose importance has long been recognised, e.g., in regard to dust elimination. Today, however, we know how complicated the whole dust question is.

MUCH therefore remains to be done; yet in many countries there are still no industrial medical officers. For this there may be many reasons, put forward by the state on financial grounds, or by employers or technical factory inspectors. As regards the financial argument, it is sufficient to mention that the economic benefit that Great Britain derives every year merely from the reduction of the number of cases of lead poisoning and the fall in the cost of this disease may be estimated at more than the salaries of all the British medical inspectors of factories put together. As an example from personal experience the writer may mention that from 1905 to 1921 I was medical officer for occupational diseases to the important Vienna sickness funds, and as such had some of the duties of a state industrial medical officer, a post at that time not yet created in Austria. In 1905 the number of cases of lead poisoning among members of the principal sickness funds was 512; in 1912 it was 163. The annual saving in benefits due to this reduction was several times his salary.

It is true that the alterations in the undertaking that have to be made for reasons of health mean additional expenditure for the employer. But if these alterations are demanded only on the basis of exact medical investigation, much will be saved that might be demanded if the investigation were less thorough. It is sufficient to refer to the question of dust. No doubt the inhalation of all dust should be prevented. But since the work of industrial medical officers has shown that quartz dust is much more dangerous than other kinds, it follows that the prevention of dust and its removal by exhaust ventilation need not be equally thorough for all kinds, and that extensive precautions are necessary against quartz dust which need not be taken against other kinds of dust.

As regards engineers, however, experience in every country has shown that satisfactory and harmonious collaboration is possible, and that it is necessary in the interest of the community as a whole. The status of the technical inspector of factories is not injured by the work of the doctor. It is improved by the esteem won by the medical inspector, which benefits the whole of factory inspection. Again from experience the writer can say that—apart from a few isolated exceptions who could not get over their egocentric standpoint and the fear of a loss of prestige—his relations with the technical inspectors steadily improved from year to year, and that many who had at first feared that the industrial medical officer would interfere in the field of their technical knowledge and duties recognised in the course of a few years that the doctor had an important and quite different task to fulfil side by side with them, and that collaboration between them could only facilitate and promote the performance of their common task.

Summing up, it may therefore be said that in every country where there is medical inspection of factories it has done important work for public health. In the present state of labor protection in civilised countries where child labor in factories no longer exists and the problems of mechanical prevention of accidents have been solved, at least in theory, the very necessary further advances, the prevention of occupational diseases and other injuries to health, can be achieved only by collaboration with the competent doctor. This doctor must act in complete independence of the engineer but in close cooperation with him. He must have an unrestricted right to inspect factories, and must have the means for scientific research at his disposal. All financial expenditure on his account earns a rich return by the reduction of disease and invalidity, and by the avoidance of unnecessary and the introduction of necessary protective measures.

Books

Attorneys' Textbook of Medicine. By Roscoe N. Gray, M. D., Surgical Director, Aetna Life Insurance Company, Hartford, Conn. 865 pp. 6x9, Cloth. Matthew Bender & Company, Albany N. Y. $12.00.

HERE is the common denominator of the medical-legal relation.

To the lawyer it gives a clear, simple picture of the medical subjects he must deal with in the presentation and litigation of claims.

For the doctor it develops not only a sound acquaintance with the multitude of problems under liability and compensation insurance, but also the basis of practical service in diagnosis and treatment which the author's experience has found most effective.

Thus, although the author calls his book "Attorneys' Textbook of Medicine," its usefulness is by no means limited to the legal profession.

Dr. Gray's field is the field of "liability medicine," heretofore thought to be—as it nearly was—confined to accidents and injuries, but lately broadening at an accelerating pace to include occupational diseases. For, as Dr. Gray remarks, "New chemical agents present medical problems more rapidly than science has been able to solve their symptomatology, diagnosis and prevention." In the employer-employee phases of these problems, however, the law will undoubtedly not wait upon the science; new claims from new causes are already more usual than unusual.

There is a growing realization in the medical field that somehow the doctor missed his opportunity in the early days of compensation laws. It is to be fervently hoped that now, in this beginning period of occupational disease legislation, he will not miss it again. But in order not to miss it, the doctor will need to think, more than ever before, of his industrial medical problems, and particularly his occupational disease problems, in terms of their cost to industry—in other words, in terms of their prevention. And in this respect alone, Dr. Gray's book meets a need that was almost acute, for the result of the study of even one specific subject as he sets it forth will be a better appreciation of the economics involved in its existence as an industrial hazard. And since this is a medical book in terms of the language of both professions, it bridges now, in time for its greatest usefulness to be fully realized, a serious gap in the relation between the two professions which almost inevitably become involved with employer-employee medical litigation.

Dr. Gray's experience of a decade in the review of claims is the basis of his interest in his subject. Since no medical text served his purpose, "chapters were written from time to time covering actual cases." He presents them here, complete from "Accidents, Authracosis . . ." to Varicocele, Varicose Veins," and follows with "Consultations; Measurement of Motion; Measurement of Strength; and the Comparative Values of Permanent Disabilities."

An idea of the scope of the treatment may be gathered from the facts that the Table of Contents listing only the Section headings fills 28 pages, and the Subject Index, one of the most complete to be found in any book, fills 117 pages. Between these there are 748 pages of text, interestingly written, technically authoritative, and logically organized as to sequence and importance. Thus the Section Headings under "Silicosis" are: Cause; Silicon Dioxide in Nature; Silicon Dioxide in Industry; Composition of Silica; Action Silica to Produce Silicosis; Symptoms; Inhibiting Agents in Silicon Change; Protective Mechanism; Duration of Exposure; Treatment; Investigation; Bibliography." His bibliographies are carefully selected; their very restraint shows complete familiarity with the literature. His tables of the comparative values of different permanent disabilities are alone worth the price of the book.

An interesting feature, made possible only by such an experience as Dr. Gray's, is the list which appears with satisfying frequency under the heading: "During investigation of claim, the following points should be specifically covered." Typical of this is the summary of the "points" on silicosis:

1. What degree of exposure to free silicon dioxide was present, making sure that other substances as silicates are not so reported?
2. How long has exposure continued under the policy in question?
3. How long and intensive was exposure during previous employment throughout the patient's life?
4. Are you sure that a diagnosis has not been made largely on x-ray findings without making certain that other disease is not the real causative factor of symptoms?
5. Do dust counts show more than 10,000,000 particules per cubic foot, of size less than 10 microns, and containing at least 35% free silica? If a different percentage of silica was present, was there a proportionate number of particles?
6. Are inhibiting agents present in the dust that will prevent silicosis, as carbon, coal, or clay?

"Attorneys' Textbook of Medicine" is published by Matthew Bender & Company, Albany, N. Y.; is priced at $12, and may be ordered through **Industrial Medicine.**

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Silicosis

By Daniel N. Barber, M.D.*
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SILICOSIS or "miner's phthisis" has been known to occur among miners in certain districts for centuries, especially among metal miners in New Zealand, Australia, South Africa, Great Britain and in many of the states of our country. It is a form of pneumonoconiosis caused by the inhalation of large amounts of extremely fine silica (SiO^2) or silicate dust. It is usually slow in development, the rate depending upon the character of the dust (silicates being not as active as free silica), the amount breathed, length of exposure and physical condition of the man. The period of exposure before development of the disease in the gold mines of South Africa is from 2½ to 7½ years. It is characterized — anatomically by generalized fibrotic changes and the development of miliary nodulation in both lungs; clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis, and by characteristic x-ray findings. This process may progress for years after exposure has ceased. In the following industries it constitutes a definite occupational hazard,—namely, the mining of metals, coal, asbestos, etc., grinding and abrasive industries, glass-making, excavating, quarrying, stone cutting, sand pulverizing, sand blasting, furnace brick manufacture, making of vitreous enamel, slate manufacture, cement and pottery industries.

It is becoming an increasing cause of industrial court actions and compensation adjustments. At present the states have varying laws regarding silicosis and usually inadequate means for diagnosing it. Competent Federal control would seem a better system, but if each state handed over all cases irrevocably to a properly constituted medical board the present chaos would be lessened.

After reading a good many pages by a considerable number of authors, I feel that we are at present in a rather vague state regarding silicosis. A few years ago it had all been worked out in a one - two - three manner — quite understandable, but recently the authorities have taken to disagreeing over many phases of the subject and seem to be actively engaged in further studies and researches with the view of rewriting the whole subject. Perhaps we will better understand the new, however, if we are more familiar with the work up to this date.

Cause: Race and habits have no significance. Most cases develop between 20 and 30 years, but the length and type of exposure is more important than age. A family history of tuberculosis or a personal history of a respiratory infection or syphilis is predisposing. Careful studies seem to indicate that anthracosis really predisposes to silicosis rather than hinders its development as previously thought. There is insufficient evidence that clay in the dust has any definite preventive influences.

Silicosis is due to breathing very fine rock dust containing silica. Dust particles must be 10 microns or less in diameter to cause the disease. This dust is measured in the air by the sugar tube method, the konimeter, and the impinger. Since the particles that are dangerous are chiefly ultra-microscopic in size, the weight methods are the more accurate in determining the amount present.

Pathology: Silica or silicate dust is somewhat soluble in water and weakly alkaline liquids similar to body fluids. Silica may do harm mechanically due to its needle-like particles, but due to its partial solubility, it probably injures the lung tissue by its poisonous action.

Unlike coal dust, the particles of silica dust remain within the so-called dust cells of the lung. These cells become clumped together to form masses of cells called false tubercles. These are first found near the surface of the lungs. At first separate, these fuse together and assist in uniformily thickening the pleura. When these dust cells reach the lymphatics, they are not all carried off but accumulate and block the passages resulting in the formation of fibrous or scar tissue.

There are five stages in the pathology: 1. The development of a dry bronchiolitis characterized by an accumulation of dust-filled phagocytes in or in relation to the terminal bronchioles with possibly some desquamation of their epithelium. 2. The accumulation of dust - containing phagocytes about and in the intrapulmonary lymphoid tissue and their transportation through the lymphatics into the tracheo - bronchial lymph nodes. 3. The gradual development of fibrous tissue within such accumulations of phagocytes and the formation of characteristic nodules of hyaline fibrous tissue. 4. Degenerative changes in these foci. 5. The hyaline nodules increase in size by extension at their periphery. Coalescence of adjacent nodules takes place and brings about involvement of further areas of the lung.

Normal lung contains 1.13 mg. of silicon dioxide per gram of dried tissue. This is always increased in silicosis. A chemical examination of the lungs should be made in every case coming to autopsy, in which there is a history of a dusty occupation.

Diagnosis: A careful history of occupation, present and past, especially as to details of the type of work and dust exposure is necessary. Subjective symptoms are—dyspnea, pain in chest of a fleeting and vague nature and not disabling, cough which is

1934. See Editorial on p. 79.

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usually not productive, occasional slight hemoptysis, night sweats, loss of strength, and gastro-intestinal symptoms suggestive of indigestion. The percentage of cases in which each of these symptoms appear is very variable.

Physical Examination: The men usually appear to be in robust health, possibly due in part to the muscular development resulting from heavy manual labor. Weight tends to increase slightly until late in the disease. Blood pressure tends to make a slight rise. A persistent marked drop in a case of silicosis indicates a probable tuberculous infection. The antero-posterior diameter of the chest tends to increase with occasional slight retractions of sternum or costal margins. In the advanced stages of silicosis, uncomplicated with tuberculosis, the chest usually appears large, compact and well built but relatively immobile. The cardinal physical finding is diminished chest expansion. Emphasis should not be put upon the chest expansion found, but rather on the importance of the comparison with the man's chest expansion found at an earlier examination. Rales are heard more often in the early cases and chiefly in the bases. There is a characteristic alteration of the inspiratory murmur from the normal vesicular character to a higher pitched or harshened, thinned and somewhat shortened type. The expiratory murmur is prolonged but remains fainter than the inspiratory.

The heart shows no consistent changes. The enlargement that often develops is seen best by a lateral x-ray.

X-ray Findings: It is generally accepted that x-ray offers the best and most reliable indication of the lung changes that occur in silicosis, particularly in the early stage. The value of this method of diagnosis depends largely upon the skill of the technician and the experience of the reader. The pictures should be made slightly "harder" than chest pictures for tuberculosis in order to block out the general haziness showing in many of them, which is probably the result of general inflammatory conditions such as bronchitis or influenza. Due to shortness of breath a rapid technique should be used.

In the definitely negative chest the hilum shadows are not more than 7½ cm. in width from the midline and do not cover more than two interspaces and one rib at a target distance of 48 inches. The hilum shadows occasionally show one or more fairly large calcifications.

In a differential x-ray diagnosis the following diseases must be considered, as at various stages they give appearances similar to silicosis, namely — tuberculosis, passive congestion due to cardiac decompensation or coronary thrombosis, bilateral bronchiectasis, asthma, infiltrating malignant metastases, polycythemia or erythemia, mycotic infections and interstitial pneumonitis.

Stages of Silicosis: Silicosis is usually divided in three stages for diagnosis, prognosis and classifications. These will now be outlined and the x-ray findings given with each stage.

First Stage (corresponds to anteprimary stage of South Africa): The symptoms of uncomplicated first stage silicosis are few and often indefinite. The man may appear to be quite well and his working capacity unimpaired. Slight shortness of breath on exertion and some unproductive cough, often with recurrent colds are the most usual symptoms. The man may have a little less ability to expand his chest than formerly and the elasticity of the chest may be slightly impaired. The earliest specific indication of the presence of silicosis is the radiographic appearance.

The hilum shadows are increased in density and larger than normal. In many instances large calcified spots are noted in or around the hilum shadows. Collections of such calcifications may involve the entire hilum. Following enlargement of the hilum shadows, the entire bronchial tree increases in density and can often be traced to the outer margins of the lungs. Along the thickened bronchial tree near the hilums are small shot-like spots described as "beads" or bronchial "buds." When the spots become noticeable throughout the lower section of the lungs, the case is classified as the beginning of first stage silicosis. These spots are fairly dense, about one-eighth of an inch in diameter, discrete, and with irregular fuzzy outline. The diaphragm and heart show little change.

Second Stage (corresponds to primary stage in South Africa):

Definite shortening of breath on exertion is usually found and pains in the chest are a frequent complaint. A dry morning cough is often present, sometimes with vomiting, and recurrent colds are more frequent. Even then the man's appearance may be healthy, but he is dyspneic on exertion, he cannot work as well as formerly and his chest expansion is noticeably decreased, the movement being sluggish and dimished in elasticity.

The characteristic radiographic appearance is a generalized medium-sized mottling throughout both lung fields. The hilum shadows are large and dense but generally do not show any more definitely than in first stage silicosis. The "beads" or "buds" along the bronchial tree become larger, more numerous, denser, clearer in outline. The diaphragm is often humped and numerous bands of adhesions are noted at the bases. Heart shadows are usually normal.

Third Stage (corresponds to secondary stage of South Africa): In the third stage the shortness of breath is marked and distressing, even on slight exertion. The cough is more frequent. The expectoration in most cases is slight. The individual's capacity for work becomes seriously and permanently impaired. His chest expansion is greatly decreased even with forced inspiration. He may lose flesh. His pulse rate may be increased and his heart may become dilated.

In the x-ray the spots described under second stage silicosis tend to coalesce, forming large areas of marked density. In some of the cases very large areas of marked density are observed. These are usually in the middle section of the lungs and are similar to tuberculous consolidations. These areas, however, are usually bilateral and blend so perfectly with the snow-storm appearance as to suggest silicotic areas, which the physical examination and laboratory findings tend to confirm.

The X-ray Appearance of Silicosis Complicated with Tuberculosis: Detection of the beginning of tuberculous infections is often very difficult because of the extensive silicotic changes. The hilum shadows are more likely to show calcified spots. Areas of marked density are usually observed at one or both apices. These areas are not so dense or opaque as the fibrotic areas of silicosis and appear cottony. They are usually unilateral in the beginning.

Treatment: Change of occupation to an open air work is necessary. Exercise is usually not restricted in uncomplicated cases. A high, dry, warm climate is best.

Prevention: The elimination of silicosis among miners depends on preventing the formation of dust by wet mining methods, such as wet drilling, wetting sides, roof and bottom and muck or rock piles; the use of sprays and water blasts to lay the dust after blasting; good mechanical ventilation to replace dusty air with clean air, and physical examination of all miners before employment and periodically thereafter.

Prognosis: The prognosis in early silicosis is good if the patient can be removed from his dusty occupation and can be placed in the open, but with advance of the disease the prognosis becomes less favorable, principally on account of the liability of tuberculous infection. The chance for recovery in the third stage is small, although open air treatment is beneficial in some cases. Recovery does not mean restoration of the tissue in the lungs to normal but subsidence of the inflammatory changes and symptoms. Susceptibility to infection is increased in all stages of silicosis, but infection is more frequent in the third stage.

In conclusion, it should be emphasized that while the cardinal symptom of silicosis is shortness of breath, the cardinal sign of decreased chest expansion and the earliest specific indication — the characteristic x-ray appearance, the diagnosis should be made only by a correlation of all facts: symptoms, signs occupational history and laboratory and roentgenological observations.

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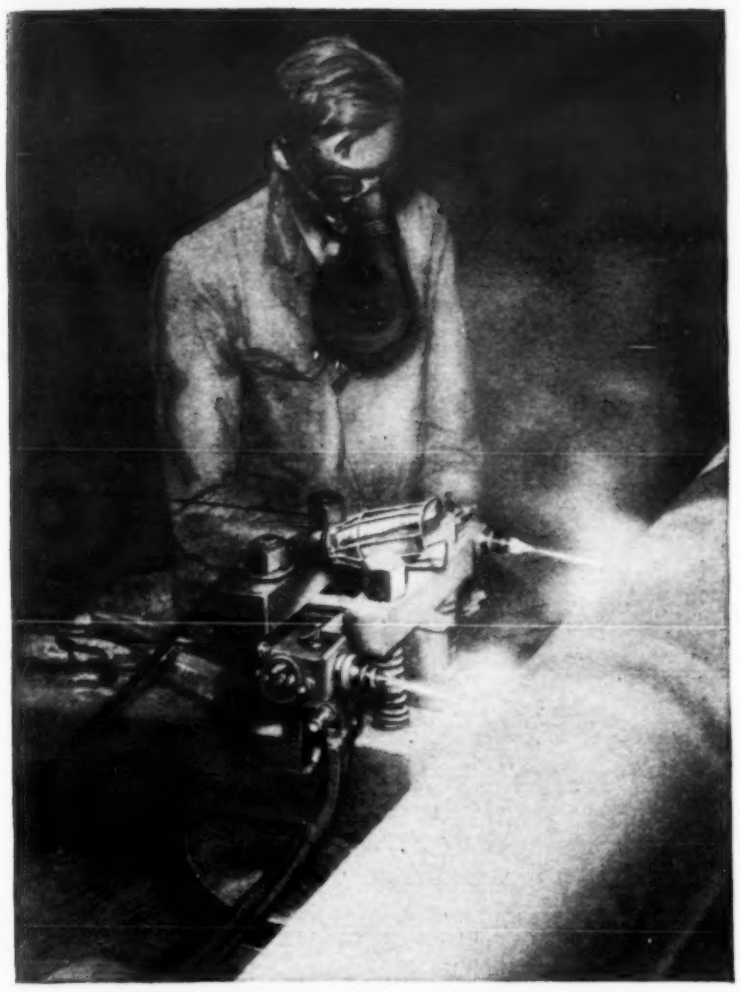

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Occupational Diseases

Occupational Diseases

REPORT of the Bureau of Occupational Diseases, lately made to the Director of Health, Dr. H. G. Southard, by Dr. E. R. Hayhurst, consultant in occupational diseases and acting bureau chief, shows that 626 Ohio physicians reported more cases in 1934—a total of 1556—than in any other year since the reporting law became operative. The previous high point was in 1929, with 1382 cases. Comparison also is made with 1258 cases in 1933. Thus notable increases are seen, the causes for which have not been investigated, but are probably various. The increase was not due to the addition of any new disease to the list of compensable diseases as none was added by the last Legislature. The report also shows that 290, or 18.6% of the 1,556 cases occurred among females.

In the past seven years, a total of 9,142 occupational diseases were reported by approximately 2,500 different physicians, and were employed by approximately 3,350 different employers.

The accompanying table tells the story for those which were compensable—1,415 cases in 1934, and 8,533 in the seven-year period.

In 1934, dermatitis, with 913 cases, constituted 58.7% of the total. Of these, 194, or 21.2% were females. Tenosynovitis was second with 228 cases, lead poisoning, third, with 162, etc.

The leading causes of dermatitis were oils and cutting compounds 131, alkalies and cleaners 83, petroleum products 49, paints, etc., 48, rubber 45, bakelite 44, plants and woods 44, lime and cement 42, dyes and dyed goods 40, etc.

The leading causes of the 162 cases of lead poisoning (and lead absorption) were: storage batteries 85, paints, dry colors, and painting 26, lead manufacture and recovery 7, caskets and vaults 6, sanitary ware 6, pottery 5, others 27. Three of the lead cases were females—one engaged at filing, one as a brass assembler, and one as a solderer. In the six years (1928-1933, inclusive), 59 deaths were associated with lead poisoning (figures for 1934 not yet at hand).

Interest centers chiefly around the non-compensable cases which are subdivided into (1) those in which the cause or agent was stated, and (2) those in which only the disease or affliction, such as bronchitis, was stated. There were 104 in the agent group and 37 in the affliction group for 1934, or a total of 141 non-compensable cases. Among the agents, dust was the factor in 54 cases, classified as silicosis 42, silico-anthracosis 5, silicatosis 1, others 6. This year no cases of asbestosis was reported. In addition, the following afflictions have a smacking of dust exposure: asthma 2, bronchitis 2 and tuberculosis 14.

During the seven-year period, 609 non-compensable cases were reported, of which 402 were "agent" cases, and 207 were afflictions. Of the 609 cases, 182 were definitely specified as due to inhaling dust, while 11 were asthma, 47 bronchitis, 64 pulmonary tuberculosis (allegedly industrial), and 8 upper respiratory irritations. Space does not permit listing the numerous other causes of occupational diseases (chiefly poisons) which are not now on the compensation schedule, but undulant fever (7 cases among dairymen, abbatoir workers, etc.) and tularemia (6 cases in rabbit handlers, etc.) are among those listed.

As regards the dust cases in the last few years, many have had their x-ray chest films sent to the department for evaluation and very complete records are had upon them. As a rule, they represent a totally and permanently disabled group. Most of them have been reported by the various state tuberculosis sanatoriums.

Of the 1,556 occupational diseases reported in 1934, 327 occurred chiefly through inhaling the substance, 933 by way of the skin, 228 through strain, 27 through friction, and 41 through other and non-specified means.

Acute mishaps, even though due to poisons, sudden strains, etc., are not included in any of the figures.

Of the 8,769 physicians registered in Ohio in 1934, 626, or 7.1% sent in 1422 of the reports (the balance being reports by two or more physicians, or physicians residing outside of Ohio, incomplete reports, etc.). The leader was a plant physician who reported 108 cases; the second highest, a company of industrial physicians who reported 59 cases; and the third, another plant physician, who reported 48 cases. But it can be seen at a glance that private physicians, reporting one or two cases per year, made up the vast majority.

From the date of the receipt of the first report, May 15, 1913, a total of 17,443 occupational diseases was reported to the end of 1934.

Of these, 2,575 were reported in the eight years prior to the time compensation for occupational diseases began (Aug. 4, 1921), or an average of 322 cases a year. Since compensation began, 14,771 have been reported, or a yearly average of 1100 cases.

Department Store Psittacosis

IN A total of 37 cases of illness among the employees a definite diagnosis of psittacosis was made in 10, and of suspected psittacosis in 27. Of the 10 definitely diagnosed as psittacosis, four died, autopsies on three

Schedule Number	1928	1929	1930	1931	1932	1933	1934	Total
1. Anthrax	.....	.....	.....	.....	.....	.....	.....	.....
2. Glanders	.....	.....	.....	.....	.....	.....	.....	.....
3. Lead Poisoning	.....	.....	.....	.....	.....	.....	.....	.....
4. Mercury poisoning	180	183	134	114	148	134	162	1,055
5. Phosphorus poisoning	.....	.....	.....	.....	.....	.....	.....	.....
6. Arsenic poisoning	.....	.....	.....	.....	.....	1	.....	1
7. Benzol poisoning (and nitro-or amido-derivatives)	.....	2	1	2	3	1	3	12
8. Volatile petroleum products poisoning (gasoline, benzine, naphtha, etc.)	11	11	3	6	9	3	10	53
9. Carbon bisulphide poisoning	3	4	2	6	5	9	10	39
10. Wood alcohol poisoning	1	1	.....	18	2	1	1	24
11. Dermatitis*	1	.....	.....	1	.....	.....	.....	2
12. Dpithelioma (skin or eyes) due to carbon, pitch, tar or tarry compounds	894	985	884	833	621	726	913	5,855
13. Compressed air illness	3	2	1	5	1	1	.....	13
14. Carbon dioxide poisoning	16	62	59	5	20	3	2	167
15. Brass or zinc poisoning	.....	.....	.....	.....	.....	1	1	2
16. Manganese dioxide poisoning (1)	7	5	2	10	2	12	8	46
17. Radium poisoning (1)	.....	.....	.....	.....	.....	.....	.....	.....
18. (a) Tenosynovitis (1) (hand)	.....	.....	.....	.....	.....	.....	.....	.....
(b) Prepatellar bursitis (1)	..... **	37	130	166	149	191	228	901
19. Chrome ulceration (nasal and skin) (2)	..... **	13	23	29	23	19	27	134
20. Potassium cyanide poisoning (2)	6	10	20	16	79	20	43	194
21. Sulphur dioxide poisoning (2)	3	2	.....	1	3	5	.....	14
Total	2	.....	.....	5	4	2	7	20
	1,127	1,317	1,259	1,217	1,069	1,129	1,415	8,533

*Specified as "Infection or inflammation of the skin on contact surfaces due to oils, cutting compounds or lubricants, dust, liquids, fumes, gases or vapors."

**Statistics not kept on tenosynovitis and bursitis in 1928. Both of these afflictions had been compensated as "accidental" injuries previous to July 1, 1929.

(1) Added to compensable list July 31, 1929, by Legislative Act, 89th General Assembly.

(2) Added to compensable list July 9, 1931, by Legislative Act, 89th General Assembly.

Summary of Compensable Occupational Diseases Reported 1928-1934, Inclusive.

of whom revealed the findings seen in psittacosis. Of the 27 suspected cases, eight were diagnosed pneumonia, of whom seven died, and 19 as suspected psittacosis only, of which number two died. Among the total of 37 cases there occurred 13 deaths, a mortality rate of 35.1%. This rather high mortality rate suggests either an extremely virulent outbreak or that cases of the disease had been missed. From the procedures carried out by the health department it is believed that but few cases were missed, as each employee absent from work for 48 hours was seen by a medical inspector.

With a history of contact with sick birds of the psittacine family, with 10 other employees having illnesses definitely diagnosed as psittacosis. with a death rate of 33.3%, and with a death rate of 87.5% of those diagnosed as pneumonia, there is little doubt that the 27 cases of suspected psittacosis were actually cases of psittacosis.

These 37 cases of illness developed among approximately 500 employees of a department store and occurred not only among those employed on the floor on which the birds were kept but among those from other floors. Employees from other floors of the store visited the birds, and these employees came in more or less direct contact with them.

During the past four years, two rather extensive outbreaks of psittacosis have occurred among employees of department stores in which pet shops were maintained. The first resulted from infected birds which had been imported into the country, and the second from birds raised at an aviary in Califorina.—Extract from L. F. Badger, **Pub. Health Rep.**, May 11, 1934, p. 584, in **American Journal of Public Health**, July, 1934.

In Latin America

THE legislation of the Latin-American countries on industrial accidents and occupational diseases has been extended in recent years, especially in the direction of increasing the employer's liability, abolishing the notion of negligence on the worker's part as exonerating the employer from his liability, and extending the idea of occupational risk to include occupational diseases.

In Argentina the provisions of the Industrial Accidents Act of October 11, 1915, were extended by Decrees of May 21, and July 21, 1930, and February 19, 1932.

In Bolivia an Act was passed on April 18, 1928, obliging employers to pay compensation for occupational diseases in the same way as for industrial accidents.

The Brazilian legislation on industrial accidents was supplemented by Decree of July 14, 1932.

The Cuban Industrial Accidents Act of 1916 was repealed by Decree No. 2,687 of November 15, 1933, which laid down new principles. Compensation is now due for industrial accidents and for occupational diseases. The employer is held to be exempt from liability only in the case of accidents due to "force majeure" not connected with the worker's employment, or deliberately caused by the victim. The same Decree provides for the setting up of an Accident Prevention Committee.

The Chilean Labour Code contains rules on compensation for industrial accidents and occupational diseases; these have been supplemented and improved by a number of Acts and Decrees, such as the Act of May 7, 1931, concerning hospital treatment and that of June 25, 1932 concerning accident insurance.

Costa Rica completely changed its Act of February 13, 1925, by Act. No. 34 of February 3, 1931, which exempts the employer from liability only in the case of accidents due to "force majeure" not connected with the worker's employment, or deliberately caused by the victim.

In Colombia, Act No. 133 of December 9, 1931 extended and amended the Workmen's Compensation and Life Insurance Act of November 15, 1915.

Ecuador replaced its older Industrial Accidents Act of 1921 by an Act of December 6, 1928, which fully covers occupational risks.

The Dominican Republic, by an Act of June 17, 1932, regulated for the first time the question of compensation for industrial accidents.

The Mexican Federal Labour Act also deals with industrial accidents and recognizes the idea of occupational risk.

Nicaragua has also legislated on the matter of industrial accidents in

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the Act of May 13, 1930, though in somewhat restricted terms as regards the worker's rights.

In Uruguay, the Industrial Accidents Act of November 1920 was amended by an Act of October 13, 1931.

New York State, 1934

JAMES D. HACKETT, Director, Division of Industrial Hygiene, in The Industrial Bulletin, State of New York Dept. of Labor:—Occupational disease cases closed under the Workmen's Compensation Law in 1934 totalled 1,012, as compared with 830 in 1933, an increase of nearly 25%. The apparent increase is due in part to an enlarged schedule of diseases listed in the law as compensable but more particularly to an improved method of recording such claims. Using the former basis of computation, the total for 1934 would be about the same as for 1933.

Of the 1,012 occupational disease claims disposed of in 1934, 439 were allowed and 573 were disallowed. Of the 573 claims disallowed, half may have involved illness or disability due to occupational disease. Of the cases disallowed, 31.6% were ruled out because the disability was brief in duration and in 17.8% of the disallowed cases the poison causing the disease was not covered by the act. Among doubtful cases, 10.3% had no medical evidence. In 85 cases, or 14.8% of the disallowed claims, the claimants did not appear.

The number of occupational disease claims which were allowed, or even the total number of such claims filed, offered only a slight indication of the widespread but undetermined damage done to industrial workers by the various forms of dust, fumes and gases in industry. As compared with the number of industrial accidents, occupational disease claims are comparatively few, yet it has been shown statistically that many classes of industrial workers die seven or eight years earlier than agricultural workers. This may be ascribed to the effect of industrial disease hazards which, while not palpable enough to show the necessary causal relation, lower resistance and render workers more liable to certain pulmonary and other diseases.

For statistical puroses, the state is divided into two districts, the New York City area and up-state. Occupational disease claims in such area were about equal in number in 1934. For the first time cases are reported by result for both areas; it is therefore possible to make comparison. Striking differences due to variation of exposure in the two districts are discovered.

Paragraphs 25 and 26 of the occupational disease schedule in the Workmen's Compensation Law provide compensation for disabilities resulting from friction and pressure in the course of employment. Ninety-one such cases were recorded in 1934, as compared with 33 in 1933. Compensation was awarded in two-thirds of the cases. The damage is generally of short duration.

Forty-seven cases of carbon-monoxide poisoning were recorded in 1934, as compared with 33 in 1933. The increase was due to garages not

Cause	Up-State		New York City		Total
	Allowed	Disallowed	Allowed	Disallowed	
Acetic acid	.....	.....	2	1	3
Acid unspecified	1	4	1	1	7
Alkali unspecified	4	11	1	2	18
Aluminum silicate	.....	1	.....	1	2
Amido benzine	.....	.....	14	6	20
Ammonia	1	2	6	.....	9
Anilin	2	1	19	5	27
Anthrax	2	.....	.....	.....	2
Arsenic	1	.....	3	.....	4
Benzine	2	.....	3	1	6
Benzol	4	.....	.....	.....	4
Calcium hydroxide	3	1	3	.....	7
Carbon bisulfide	.....	.....	2	.....	2
Carbon dioxide	.....	1	.....	.....	1
Carbon monoxide	7	26	4	10	47
Carbon tetrachloride	.....	2	2	2	6
Cellulose acetate	.....	.....	.....	1	1
Cement	5	8	7	1	21
Chemical unspecified	3	2	.....	2	7
Chlorine	.....	3	.....	1	4
Chrome	7	10	8	3	28
Citric acid	.....	.....	.....	1	1
Color	1	.....	.....	.....	1
Creosote	1	.....	.....	.....	1
Dermatitis unspecified	2	7	.....	3	12
Dermatitis N. S.	.....	22	3	58	83
Disease unknown	.....	.....	.....	1	1
Disease N. S.	2	22	1	30	55
Dust unspecified	.....	1	.....	.....	1
Dye unspecified	2	3	.....	2	7
Dye cloth	.....	3	.....	.....	3
Dye fur	.....	.....	5	17	22
Dye leather	3	.....	.....	.....	3
Dye silk	.....	.....	1	1	2
Dye vegetable	.....	.....	.....	1	1
Ether	.....	1	.....	.....	1
Ethylene glycol	1	.....	.....	.....	1
Flour	.....	2	1	1	4
Formaldehyde	.....	2	2	1	5
Friction	32	15	8	8	63
Fruit	.....	.....	1	1	2
Fur	1	.....	.....	1	2
Gas unspecified	.....	1	.....	.....	1
Gasoline	5	8	7	2	22
Glue	.....	1	.....	.....	1
Hydrochloric acid	1	1	2	2	6
Hydrocyanic acid	.....	.....	1	.....	1
Hyrodfluoric	1	.....	.....	1	2
Hydrogen sulfid	3	3	.....	.....	6
Hydroxy benzol	.....	.....	1	.....	1
Infection	1	.....	.....	.....	1
Ink unspecified	.....	1	.....	.....	1
Insecticide	.....	1	.....	.....	1
Kerosene	2	2	1	3	8
Lacquer	3	4	.....	2	9
Lead	5	4	7	5	21
Lead arsenate	.....	5	1	.....	6
Lead battery	14	1	.....	.....	15
Lead carbonate	.....	.....	1	.....	1
Lead color	1	.....	1	.....	2
Lead oxide	1	.....	3	1	5
Lead paint	6	3	12	8	29
Lead paint dust	2	1	8	4	15
Lead solder	.....	.....	1	2	3
Leather	1	.....	.....	.....	1
Mercury	.....	1	.....	.....	1
Meta para amido phenol	.....	1	.....	2	3
Methane	1	.....	.....	.....	1
Methyl alcohol	1	1	2	.....	4
Methyl chloride	.....	3	.....	.....	3
Naphthalene der	.....	.....	3	3	6
Nickel	.....	1	2	1	4
Nicotine	.....	1	.....	.....	1
Nitro cellulose solution	.....	.....	.....	2	2
Nitrous oxide	.....	1	.....	.....	1
Oil unspecified	3	3	4	2	12
Oil essential	.....	.....	1	.....	1
Oil machine	2	7	2	6	17
Oil mineral	.....	.....	6	4	10
Oil vegetable	1	.....	2	1	4
Oxalic acid	.....	1	3	.....	4
Paint unspecified	1	2	1	.....	4
Paraphenylendiamin	.....	.....	1	.....	1
Petroleum naphtha	.....	.....	1	2	3
Petroleum product (unspecified)	.....	.....	.....	1	1
Phenol	.....	.....	2	.....	2
Phenol product	1	5	2	2	10
Pitch	1	.....	.....	.....	1
Plants unspecified	.....	1	.....	2	3
Poison ivy	11	27	.....	6	44
Potassium cyanide	.....	2	2	1	5
Pressure	15	9	4	.....	28
Rubber	.....	1	.....	.....	1
Shoe cement	1	.....	.....	.....	1
Shoe cleaner	1	.....	.....	.....	1
Shoe dressing	3	.....	.....	.....	3
Silica	.....	2	.....	1	3
Silk	1	3	.....	1	5
Soap	3	5	36	19	63
Sodium carbonate	2	2	3	4	11
Sodium chloride	1	1	.....	3	5
Sodium cyanide	.....	.....	.....	1	1
Sodium hydroxide	3	3	11	6	23
Sodium nitrate	.....	1	.....	.....	1
Sodium silicate	.....	2	.....	.....	2
Sodium triphosphate	.....	.....	.....	1	1
Starch	1	.....	.....	.....	1
Sugar	.....	.....	.....	1	1
Sulfur	.....	1	.....	.....	1
Sulfur dioxide	.....	1	.....	3	4
Sulfuric acid	2	1	3	.....	6
Tar	.....	.....	.....	1	1
Tetrachlorethane	.....	.....	.....	1	1
Tetraethyl lead	.....	1	.....	.....	1

Cause	Up-State Allowed	Up-State Dis-allowed	New York City Allowed	New York City Dis-allowed	Total
Thinner	.....	1	.....	.....	1
Toluol	.....	1	.....	.....	1
Trauma	2	4	2	2	10
Trisodium phosphate	1	1	1	1	4
Turpentine	2	1	2	1	6
Varnish	1	.....	.....	.....	1
Vegetables	3	3	.....	.....	6
Vegetable dust	.....	.....	.....	2	2
Wood dust	2	2	.....	.....	4
X-ray	.....	.....	.....	2	2
Zinc	1	4	.....	.....	5
Not given	.....	.....	.....	2	2
Total	200	293	239	280	1,012

OCCUPATIONAL POISONS AND DISEASES
Closed Cases — New York 1934

ventilated in periods of intensely cold weather early in 1934, indicating the necessity for special precautions at such times.

Cases of lead poisoning showed a slight increase for the state, but a substantial decrease in the New York City area where figures are comparable, declining from 58 to 50. The number of cases of lead poisoning in lead battery plants was about the same but further improvement would seem to be possible.

Reason for Disallowance	Up-State	New York City area	Total No.	Per cent
Not covered by act	15	87	102	17.8
No proof of causal relation	7	7	14	2.4
No medical evidence	9	50	59	10.4
Not an occupational disease	16	7	23	4.0
No proof of disease	4	1	5	.9
Not contracted within 1 year	.....	1	1	.2
Disability less than 7 days	159	22	181	31.6
No disability	34	49	83	14.5
No appearance of claimant	41	44	85	14.8
No claim filed	3	6	9	1.6
No notice in time	1	2	3	.5
Claim abandoned	.....	1	1	.2
No jurisdiction	1	1	2	.3
Grounds not recorded	3	2	5	.8
Total	293	280	573	100.0

Dermatitis due to unspecified, non-schedule, or unidentified causes decreased. Cases due to poison ivy dropped from 151 to 44, largely because of decreased Federal works and better use of preventive measures. Most of the dermatitis cases due to unspecified, non-schedule, unidentified causes were disallowed because of lack of evidence as to causal relation. The use of strong alkalis and the continuous use of soaps in cleaning cause dermatitis in many instances. Most of these cases are disallowed because the period of disability is short.

Occupational disease statistics must continue to be unsatisfactory as long as the owners of certain factories are content to allow compensation to their employees without a knowledge of the actual cause. Manufacturers who permit this practice lack appreciation of the value of such information in devising and instituting preventive measures. The following list includes such vague classifications as "shoe dressing" and "shoe cleaner" which are too indefinite for precise classification.

A wide range of substances cause damage of one sort or another and it would be desirable for each employer to scan the following list to ascertain if he uses any of them in his operations. The great principle of prevention is dilution, or alteration. If gases or poisonous substances permeate the air they should be diluted by fresh air. Protection may also be secured by alternation of work where possible. Many employers use substances the nature of which they are ignorant. One employer recently declared that he had never heard of silicia as a possible hazard to health. It is certainly desirable that every employer should acquaint himself with the poisons that have caused damage to industrial workers.

Of the total of cases disposed of during the year, only 43.6% are allowed; 56.4% were denied. The following figures show the reasons why compensation was not obtained. It is evident that there are many limiting conditions, the chief of which is the provision denying compensation if the period of disability is less than seven days.

Hazards of Cement Industry

A PUBLICATION emanating from the U. S. Public Health Service (The Health of Workers in Dusty Trades: I. Health of Workers in a Portland Cement Plant, Public Health Bulletin 176, 1928) ably presents the hazards growing out of exposure to cement. A few years ago the Retail Credit Company of Atlanta, Ga., published a small pamphlet discussing the hazards conected with gypsum. These two publications fully will supply information as to the hazard connected with these substances. Silicosis is not a highly probable result of exposure to the dust of the substances mentioned. The silica content of cement is low. The limestone used in the manufacture of cement is not likely to contain more than 4% of free silica, but the shale in cement manufacture may contain as high as 40% of free silica. Although silicosis is a possibility, the chest condition occasionally found among cement workers is more likely to be a non-characteristic pneumonoconiosis. The same is true of gypsum. "Plaster" is a loose term that may be applied to

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Accidents

OCCUPATIONAL POISONS
Anthracosis
Asbestosis
Baker's Itch
Benzol Poisoning
Carbon Monoxide Poisoning
Carbon Tetrachloride Poisoning
Chromium Poisoning
Lead Poisoning
Manganese Poisoning
Mercury Poisoning
Methyl Bromide Poisoning
Silicosis
Sulphur Dioxide Poisoning

INFECTIONS
Bacteriology
Infection
Anthrax
Arthritis
Rheumatic Fever
Arthritis-Rheumatism
Glossary of Terms
Heart Disease
Osteochondritis Deformans
Osteomyelitis
Pannus
Syphilis
Paresis; Tabes
Trachoma
Trichomonas
Tuberculosis

NON-INFECTIOUS
Buerger's Disease
Compressed Air Disease
Fractures: Types and terms
Hernia
Hodgkin's Disease
Hydrocele
Pterygium
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a variety of mortars and cements. Some plasters, as used, may contain a high content of free silica. In addition to the industrial disorders a few other conditions may be specified as a possible occurrence in connection with the manufacture and application of cement, plaster and gypsum. Among others are temporary deafness connected with impacted cerumen, pneumonoconiosis, furunculosis and an increased incidence of pneumonia and other respiratory diseases.—**J.A.M.A.**, July 7, 1934.

Substandard Workers

PHYSICAL examinations of substandard workers in specified industries have been made by deputy state health officers in a number of counties in Maryland, recently, at the request of the state commissioner of labor and statistics, with the approval of the state board of health. Required under the NRA, the examinations are to determine the extent to which physical handicaps or infirmities constitute a disability for the particular job on which a worker is engaged. Following these examinations, persons who are physically handicapped may be certified for employment, the wage rate to be adjusted in accordance with the extent of the disability.

The National Income

INCOME from all wages and salaries in 1934, totalling about $35,000,000,000, was 15% larger than in 1933, or two thirds of the 1929 total, and nearly one third larger in December 1934, than at its low point in March 1933. Factory wage rate increases continued during the year, while average earnings of employed factory labor have risen about one third from the low point of the depression.—Frederick H. Ecker.

Toxicology

Dyes and Mercury

DR. WALTER CLARKE'S Abstracts and Comment, in Medical Times and Long Island Medical Journal, June, 1934:—**The Carcinogenetic Agent in Anilin Tumors of the Bladder.** G. H. Gehrmann (**Journal of Urology,** 31:126-137, February, 1934) reports that in a plant manufacturing coal tar dyes since 1916, cystoscopic examination of 532 men employed showed bladder tumors in 25 cases, or 4.5%; in addition there were 16 cases in which hemorrhagic areas were found in the bladder. In another group of 55 men examined cystoscopically, 2 cases of bladder tumor were found —3.6%. Of the 25 positive cases in the first group, 14 were papillomata, 8 definitely carcinomas, and 3 "questionable carcinoma"; all of these men were exposed to beta naphthylamine or benzidine; only 2 had not been exposed to the former product. In the second group both men had been exposed to alpha naphthylamine, which as made in the United States contains about 5% beta; the tumor in these cases was papilloma in one case and carcinoma in the other. No cases of bladder tumor have been found among aniline workers in this plant; but the combined experiences of the dye industries in Germany, Switzerland, England and America indicate that aniline, alpha and beta naphthylamine and benzidine are the carcinogenetic agents in the coal tar dye industry. Bladder tumors may appear any time after two years' exposure to the carcinogenetic substances; removal from the dye operation does not eliminate the danger of a future development of bladder tumor. At the plant under the author's medical supervision, employees working in aniline, alpha or beta naphthylamine and benzidine are required to have a cystoscopic examination once a year, a urinary examination every three months, and with the appearance of any blood in the urine or bladder symptoms, an immediate cystoscopy. It has been the practice to remove any man developing bladder symptoms or tumor from the area where he has been working, but as this does not prevent the development of cancer, the author considers it preferable to treat the condition and return the man to work in the area, as this prevents exposure of another man; this is the procedure followed in Germany. The adoption of a completely closed and properly ventilated process together with careful medical supervision and protection will eliminate the hazard.

Mercury-Laden Air. A. M. Fraser, K. I. Merville and R. L. Stehle (**Journal of Industrial Hygiene,** 16: 77-91, March, 1934) state that prolonged inhalation of air containing mercury vapor is recognized as an important hazard in certain industries, yet there is no exact information concerning the concentration of mercury in the air that is definitely toxic. Accordingly the authors undertook experiments on dogs exposed to the continuous inhalation of mercury vapor of known concentration. It was found that inhalation of a concentration of 1.89 mg. mercury vapor per cubic meter of air for eight hours daily during a period of forty days did not produce any evidence of mercury poisoning; the minimal concentration of mercury vapor that invariably produced chronic toxic effects under similar conditions was 3.05 mg. per cubic meter. Higher concentrations were proportionately more toxic, and produced more acute effects. In a dog weighing about 12 kg. at the time signs of mercury poisoning appeared, the average daily excretion of mercury was about 0.5 mg. If man is equally susceptible to mercury vapor, the average daily urinary excretion of mercury when symptoms of mercury poisoning become evident, would be about 3 mg. daily. Experiments on the absorption of the concentration is from 2.91 to mercury vapor indicate that when 26.18 mg. per cubic meter of air, the proportion absorbed varies from 21.3

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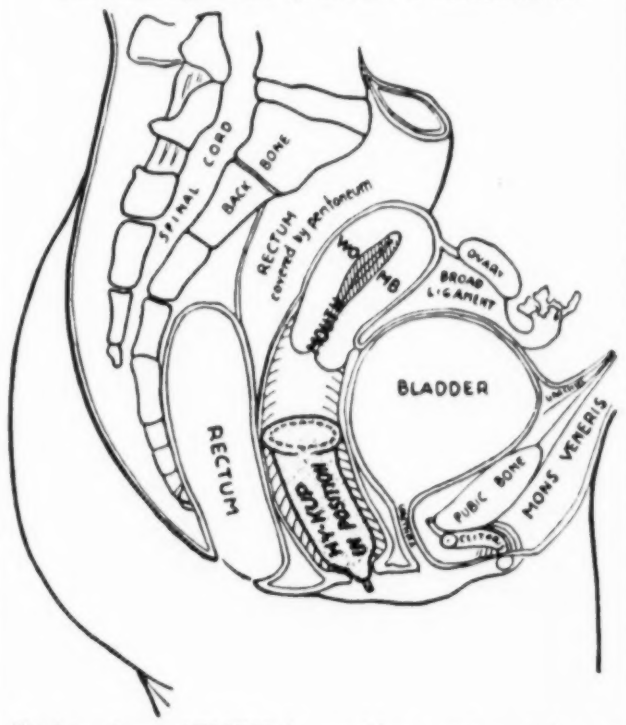

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to 26.6% (averaging 24.16%) of that inhaled.

Comment. The article by Gehrmann and that by Fraser, Merville and Stehle give an indication of new health hazards arising from new industrial processes. A whole new field of physiological and pathological research is growing up for the study of new factors in industrial environment. That branch of medicine which deals with these problems is becoming more and more specialized and its technical aspects more intricate, keeping pace with technological advances.

Industrial Diseases and Poisoning in British Factories, 1933

IN GENERAL, the incidence of cases of poisoning from many of the recognized industrial hazards showed continuing improvement in British factories and workshops in 1933, according to the latest report of the senior medical inspector of factories.

Special investigations of health hazards made during the year included a study of cases of cancer of the nose occurring at a nickel refinery works, of the risk of silicosis among sand-blasters, and of the effects of French chalk in the production of fibrosis of the lungs.

Table 1 shows the number of cases of disease resulting from the use of some of the more important industrial poisons for certain years from 1910 to 1933.

The number of cases of lead poisoning, including fatal cases, was the smallest in any of the years covered in the report and with the exception of one case in the manufacture of lead arsenate no new source of poisoning from lead had arisen during the year. Cases of anilinism and toxic jaundice were fewer than in the preceding year, but of the two cases of chronic benzene poisoning reported one ended fatally in 1934.

An increase in the number of reported cases of anthrax was due entirely to contact with hides and skins. The report states that as no satisfactory method has yet been devised for the disinfection of these raw products and there is no apparent prospect of such a method being discovered, the use of imported infected material will continue to be a source of risk.

Cancer of the bladder resulting from exposure to certain chemicals—aniline and allied intermediate dyestuffs—has been a problem for some years. An intensive study was carried out during the past two years in Huddersfield where large works manufacturing intermediate dyestuffs are situated. The earliest recorded death among these workers from a new growth of the bladder occurred in 1900 and from that time to the end of 1932, 31 further deaths from this cause were registered among these workers, while 71 cases were reported among workers outside the chemical industry. It was found that the average age at death of the chemical workers dying from this disease was 53.2 years, while among nonchemical workers it was 63.6 years — an important point in considering the cause of the disease. The occupation of chemical laborer was the only one in which there were a number of fatal cases, all other occupation groups having only one case each over the 33-year period with the exception of cotton dyers among whom two cases were reported.

Since the chemical workers handled a variety of chemicals it was impossible to identify a particular chemical as the cause, although exposure to aniline, benzidine, alpha- and beta-naphthylene and their derivatives appeared to predominate in the history of these cases. If the disease is discovered in the early stages an operation carries the probability of a complete recovery but the growth becomes malignant in the later stages and even though operated upon there is probability of recurrence. While efforts to reproduce the disease in animals have been only partially successful, it appears that preventive measures should include the prevention of absorption by the removal of dust and fume and the avoidance of contact of the skin with these products.

Statistics of deaths from silicosis and asbestosis have been collected in the past few years and in all the cases recorded there was no doubt as to the cause of death, in the majority of cases the diagnosis having been confirmed by postmortem examinations. The report contains particulars of 53 deaths from asbestosis or asbestosis with tuberculosis and 469 deaths from silicosis or silicosis with tuberculosis.

Table 2 shows the number of deaths from silicosis and asbestosis alone or complicated with tuberculosis, the average age at death, and the number of years of exposure to either type of dust.

The largest number of fatal cases occurred in the pottery industry—an industry in which workers tend to remain throughout their entire working life. In this industry there were 111 deaths from silicosis and 109 from silicosis and tuberculosis or about 47% of the total number of deaths from the combined causes. Next in importance in the number of deaths from this cause was the sandstone industry, followed by metal grinding, sand-blasting, and the manufacture of scouring powders. The average duration of employment which is synonymous with duration of exposure to dust was longest in the pottery industry and shortest in the scouring-powder industry and in sand-blasting, there being very little difference in the rates for the latter two industries. Sand-blasting, which is of more importance because of the number of workers involved, is said in the report to have been shown to be an extremely dangerous occupation. The risk of the process is such that the use of substitutes for siliceous material is advised wherever possible, and in other cases enforcement of the strictest precautions with initial and periodic medical examination of the workers.

Reporting of cases of skin disease is not compulsory, but during the year there were 988 cases reported, 18 of which were nonindustrial and wrong-diagnosis cases. The causative agents in the reported cases included alkalies, sugar, oil, chrome, turpentine and substitutes, dyes, chemicals, friction and heat, petrol, benzol, dough, acids, paraffin, French polish, nickel compounds, and accelerators.

There were 149 accidents from inhalation of gases and fumes, 14 of which were fatal. Eighty of the accidents, including nine fatalities, were due to carbon monoxide, the next most important causes being inhalation of the fumes of nickel carbonyl, chlorine, carbon dioxide, sulphur dioxide, sulphureted hydrogen, and hydrocyanic acid. — **Monthly Labor Review.**

Disease	1910	1920	1930	1931	1932	1933
Lead poisoning:						
Cases	505	289	265	168	182	168
Deaths	38	44	32	21	23	19
Mercury poisoning:						
Cases	10	5	3	6	2	1
Deaths	1	.....	.....	.....	.....	.....
Arsenic poisoning: Cases	7	3	1	.....	1	1
Carbon bisulphide poisoning: Cases	.....	.....	.....	5	2	.....
Aniline poisoning: Cases	.....	.....	24	30	24	12
Chronic benzene poisoning:						
Cases	.....	.....	.....	1	.....	2
Deaths	.....	.....	.....	1	.....	.....
Toxic jaundice:						
Cases	.....	6	.....	7	3	2
Deaths	.....	.....	.....	2	.....	.....
Anthrax:						
Cases	51	48	43	21	16	21
Deaths	9	11	6	4	1	2
Epitheliomatous ulceration:						
Cases	.....	45	194	156	131	143
Deaths	.....	1	36	46	44	40
Chrome ulceration: Cases	.....	126	95	65	77	73

Table 1.—Number of cases of poisoning and of industrial disease among factory workers in Great Britain, 1910 to 1933

Disease	Number of deaths	Average age at death	Duration of employment (years)		
			Longest	Shortest	Average
Silicosis	204	54.3	60.0	2.3	34.4
Silicosis with tuberculosis	265	52.4	67.0	2.0	31.5
Asbestosis	35	41.0	27.0	3.5	13.4
Asbestosis with tuberculosis	18	38.2	18.0	2.3	9.6

Table 2.—Number of deaths from silicosis and asbestosis in Great Britain, average age at death, and duration of employment

Test of Health Insurance

THE Manitoba Department of Health has decided to make a practical test of health insurance, to continue for two years, by establishing in the municipality of Woodworth, a community of 2,000 residents, a scheme which contains the following provisions: (1) complete

medical service, including surgery, hospitalization and cost of prescriptions; (2) payments of doctors' fees and hospital charges through taxation on property and a poll tax; (3) right of the individual, within reasonable limits, to choose his own physician or surgeon and select the hospital to which he desires to go for treatment; (4) maintenance of competition between doctors, continuance of the high standard of medical care and protection against racketeering by doctors.

Pat and Pertinent

Likewise Doctor-Patient Relationships: — "Employer-employee relationships are individual in character, not national in scope."—Alfred P. Sloan, Jr.

Napkin for This Talent?—"Sneezing is a talent and people should not be ashamed of it." — Dr. Octavio Lewin.

One More Occupational Disease:—"Coincident with the popularity of wrestling in all parts of the country, reports from ophthalmologists of wrestlers' trachoma are also increasing."—**The Sight-Saving Review.**

As It Should Be:—"As the medical head of the Service Department, the director of service is given full responsibility and authority to attend to all matters concerning the human phases of the plant."—Dr. R. C. Engel, Director of Service Dept., The Corrigan, McKinney Steel Company.

Take a Deep Breath:—"The puzzlers have a word for it, and it is 'pneumonoultramicroscopicsilicovolcanokoniosis.' That 45-letter word has replaced 'electrophotomicrographically,' mere upstart of 28 letters, as the longest word in the English language recognized by the National Puzzlers' league. It's the name of a special form of silicosis caused by ultramicroscopic particles of siliceous volcanic dust."—**Chicago Tribune.**

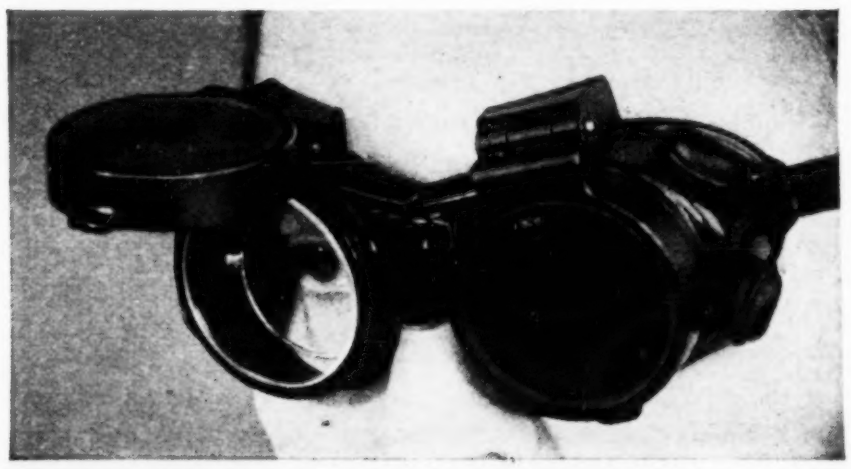
Write For Detailed Information

About: (and mention *Industrial Medicine*) To:

The Items and Things Herein Described	The Manufacturer Whose Name and Address Are Given

New Type Safety Goggle

WILLSON PRODUCTS, INC., Reading, Pa., have a new goggle, for protecting the eyes of industrial workers exposed in hazardous eye zones where, owing to the requirements of the worker and to meet the changing eye hazards in his work, it is necessary for him to change his goggles from time to time. This goggle is a combination having clear lenses for protection against impact, such as from flying chips, and, through a hinge arrangement, another set of welding lenses for protection against dangerous light rays and glare. The outer set can be raised out of focus when not needed and closed down over the chipping lenses when required for welding protection. This style of goggle can be worn over spectacles.



Willson Products New Type Safety Goggles

Willson Respirators Approved

THE United States Bureau of Mines, Department of the Interior, has formulated a series of tests for determining the efficacy of filter-type respirators designed for use against mechanically generated dusts, fumes of various metals, and mists. These tests are described in Schedule 21, 'Procedure for Testing Filter-Type Dust, Fume, and Mist Respirators for Permissibility." Schedule 21 supplies a long recognized need: a Federal testing code to which respirator manufacturers could turn for certification of their product. Purchasers of respirators approved by the U. S. Bureau of Mines can be assured that the devices will pass the minimum requirements given in Schedule 21, namely, that the respirator must provide adequate protection with reasonable comfort to the wearer. The requirements of this schedule cover the packaging, marking, materials, design construction, resistance to air flow, and filtering efficiency of the respirator. The complete respirator, not the filter alone, is tested by man and machine.

The approval testing of a respirator will not be undertaken by the Bureau of Mines unless the device is completely developed and of the design and materials which the manufacturer believes suitable for a finished marketable device. The respirator must also be subjected to inspections and tests of the nature described in Schedule 21, and it must meet these requirements when tested by the manufacturer or his testing agency. The manufacturer must also give assurance that he will maintain the quality of protection equal to that of the devices submitted.

Up to February 15, 1935, four respirators have been approved by the United States Bureau of Mines for permissibility against Type A (dusts) suspensions of atmospheric particulate matter.

Two of the four respirators approved are the Willson Bag Respirator No. 300 and the Willson Bag Respirator No. 400, both made by Willson Products, Inc., Reading Pa.

The Haskell Laboratory

E. I. DU PONT DE NEMOURS & Company dedicated and opened on January 22, its new medical research laboratory to be known as the Haskell Laboratory of Industrial Toxicology, the purpose of which will be to test thoroughly, from a health standpoint, all products produced by the company before they are placed on the market. The laboratory was planned to meet a need which has developed in this country because of the great growth of the chemical industry. Many new products have been developed in recent years and other new products are constantly being developed, some of them through entirely new processes. A function of the laboratory will also be to study the possible effects of new products upon employee health.

The importance of the analyses and studies to be made will readily be understood by manufacturers. It will mean that before new products are produced on a large scale and put on the market, they will be given the most thorough examination and the most exhaustive study in regard to any potential danger which might exist, either on other industries during the process of manufacture or on general consumers who may buy them from manufacturers. Its staff will be the largest and its equipment the most extensive of any laboratory in the world. Its director is Dr. W. F. von Oettingen who received his chemical training at the University of Jena and Goettingen, Germany, and his Ph.D degree at the University of Goettingen. Later he studied medicine and the relation between chemical constitution and pharmacological action. Finishing his pre-clinical course in Goettingen, he entered the University of Heidelberg, where he specialized in internal medicine and pharmacology. He came to this country in 1924 and the following year joined the staff of the medical school of Western Reserve University in Cleveland.

Dr. von Oettingen is assisted by Dr. W. C. Hueper, a graduate in medicine from the University of Kiel, and who for six years was director of laboratories at Mercy Hospital, Chicago; by Dr. Frank W. Wiley, a graduate in chemical engineering from the University of Denver, who received his Ph.D degree at the University of Michigan, and who holds the National Research Council Fellowship at the University Hospital at Ann Arbor, Michigan; and others in charge of various phases of the work.

In connection with the dedication of the laboratory there was a scientific meeting at which addresses were made by Dr. R. R. Sayers, Medical Officer in Charge of the office of Industrial Hygiene and Sanitation of the Public Health Institute, Washington, D. C., on "Relations between Government and Industrial Hygiene"; and addresses by Dr. G. H. Gehrmann, Medical Director of the du Pont Company, who spoke on "Development of Industrial Medicine," and by Dr. W. F. von Oettingen, on "The Problems of Industrial Toxicology."

Cigarettes

PHILIP MORRIS & COMPANY, Ltd., Inc., 119 Fifth Avenue, New York, announce "a successful attempt to measure objectively the irritant properties of cigarette smoke." The study was made by Michael G. Mulinos and Raymond L. Osborne, from the Department of Pharmacology, College of Physicians and Surgeons, Columbia University, and is available in booklet form as a reprint from the Proceedings of the Society for Experimental Biology and Medicine (1934, 32, 241-245).

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150 Years of Publishing

ON JANUARY 25, Lea & Febiger, of Philadelphia, celebrate the completion of 150 years of continuous activity as publishers. The business was established in 1785. Since then it has been in continuous operation in the same family, one of the members of the present firm being a great - great - grandson of Mathew Carey, the founder. Carey came to Philadelphia from Dublin in November, 1784. LaFayette, who had known him in Paris, was visiting Washington at Mount Vernon at the time and was returning to Princeton. Hearing of Carey's arrival, he stopped off in Philadelphia to see him and the next day Carey unexpectedly received his check for $400, a benefaction with which he at once established himself in the publishing business. When LaFayette returned to America on his next visit, Carey had the satisfaction of returning this sum. In the early days the firm gave its attention to general literature, and among its important publications were the Bible in quarto, both the Douay translation and the Authorized Version, which, for a considerable period, were the only quarto Bibles of American manufacture in the market; Weems' biographies of Washington and Marion, Jefferson's "Notes on Virginia," Bonaparte's "American Ornithology," and (in this country) the Waverley Novels, and the works of Dickens; also the works of Washington Irving, the novels of James Fenimore Cooper, the "Encyclopedia Americana," and other famous books.

Later it began specializing in medicine and has continued in this field. Since 1859 it has been the publisher in America for Gray's Anatomy, termed "The Bible of Medicine." It also publishes The American Journal of the Medical Sciences, now in its one hundred and fifteenth year of continuous publication, having been established in 1820 as the Philadelphia Journal of the Medical and Physical Sciences, the first editor being Dr. Nathaniel Chapman, who was also, in 1847, the first president of the American Medical Association. With a single English exception, this is the oldest medical periodical in the language. Among the distinguished physicians who in past years have contributed works recognized as classics in their field are Wistar, Coxe, Horner, Gibson, Dewees, Dunglison, Meigs, Hodge, Leidy, Dalton, Stille, Gross, Flint, Pepper, Osler, Adami, Brewer, Starr, Musser, Hyde, Hare, Stimson, Cushny. The list of present day publications contains the names of many equally well-known living authors. In addition to Medicine, Dentistry and Pharmacy, the firm has in recent years taken up collateral lines, such as Nursing, Physical Education, the Biological Sciences, Veterinary Medicine and Scientific Agriculture.

From Dr. Claude Wm. Chamberlain's Radio Talks

"D. J. PRICE, of the Department of Agriculture, likes to demonstrate how tiny particles of dust may create more havoc than dynamite. He entertains and educates visiting firemen, millers, farmers, insurance inspectors, and manufacturers of anything from cotton goods to evaporated milk. Mr. Price builds buildings and then blows them up with corn starch or what have you. He dumps the corn starch into a corner, fans the air and then ignites the dust with an electric spark."

"DR. COLIN G. FINK, of Columbia, announces that it is now possible to remove all the smoke-grime from cities and industrial centers. It has been found that a chain, suspended in a belching factory chimney and connected to give off static electricity, will precipitate smoke, dust and even odors. The precipitated mass at the chimney base yields substances—even silver and gold in the case of smelters—sufficient to pay for the installation in a few months. He says: 'I can see no reason why it should not become possible by an analogous system of precipitation of moisture outside population centers to keep snow and rain from the streets and roofs of our cities'."

"THERE are numerous domestic airports at which planes from foreign countries land, that have no medical facilities. In 1932, for example, 1,977 airplanes carrying 5,371 persons from foreign ports entered the United States without medical examination, because they had permits to arrive at ports where medical officers were not available. Nearly one-half the planes and about one-fifth of the total of passengers and crews arriving from foreign ports escaped medical examination during 1932. With the germs of respiratory disease still living after two days, it would appear that pneumonia, diphtheria, scarlet fever, septic sore throat, and erysipelas germs might be among those carried by airplane to and from ports thousands of miles distant. Even the typhoid and dysentery microbe living for seven or eight hours might easily survive in the closed cabin of an airplane until it had crossed half the continent."

WANT ADS

WANTED—Physician seeks connection in the practice of industrial medicine. Prefers location in Illinois or Missouri. For particulars address INDUSTRIAL MEDICINE, 844 Rush Street, Chicago, Ill.

WANTED: Back numbers of INDUSTRIAL MEDICINE: October, 1932; September, 1933; November, 1933. Will pay $.50 each for copies of these in good condition. INDUSTRIAL MEDICINE, 844 Rush St., Chicago, Ill.

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* Original Article in **Industrial Medicine.**